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ANALYTICAL KEY
TO THE COMMONLY OCCURRING
NATURAL ORDERS OF BENGAL

ANALYTICAL KEY TO THE COMMONLY OCCURRING NATURAL ORDERS. OF •BENGAL

BY

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PREFACE

In compiling this Key containing 79 natural orders I have followed Bentham and Hooker's System of Classification. I have included almost all the natural orders commonly occurring in Bengal. It is neither practicable nor botanically justifiable to restrict a botanical survey of phanerogamic species within the political boundary of Bengal. I have therefore included a few species found in the Darjeeling Himalayas and in the Khasi Hills to make the list as complete and representative as possible, remembering at the same time the scope of the B.Sc. Pass and Honours Standards.

Short generic details have been given in some cases which are of popular and economic importance or possess morphological peculiarities. The diagnostic characters have been taken from actual specimens examined by me and verified from the Herbarium of the Royal Botanic Garden, Sibpore.

BOTANICAL LABORATORY,
PRESIDENCY COLLEGE,
CALCUTTA :
12th April, 1933. }

S. C. BANERJI.

Synopsis of the Common Natural Orders of Bengal.

Class. Dicotyledones.—Flowers 5- or 4-merous.

Sub-class. Polypetalæ.—Calyx and corolla distinct, petals free.

Series. Thalamifloræ.—Sepals generally free, Petals always free, more than the sepals in number. Stamens hypogynous. Petals and stamens on the thalamus. Pistil $\frac{\text{syn}}{\text{apo}}$ carpous.

Cohort. Ranales.—Stamens many. Carpels many, free.

Orders.—1. Ranunculaceæ. 2. Dilleniaceæ. 4. Magnoliaceæ. 5. Anonaceæ. 6. Menispermaceæ. 7. Berberidæ. 8. Nymphoeaceæ.

Cohort. Parietales.—Pistil syncarpous ; ovary with parietal placenta.

Orders.—10. Papaveraceæ. 10a. Fumariaceæ. 11. Cruciferæ. 12. Capparidæ. 15. Violaceæ. 17. Bixineæ.

Cohort. Polygales.—Stamens not many. Ovary 2-3-celled with axile placenta.

Order.—20. Polygalaceæ.

Cohort. Caryophyllales.—Ovary 1-celled with free-central placenta.

Orders.—22. Caryophyllaceæ. 23. Portulacaceæ.

Cohort. Guttiferales.—Stamens very many. Ovary many-celled with axile placenta.

Orders.—27. Guttiferæ. 28. Ternstroëmiaceæ. 29. Dipterocarpeæ.

Cohort. Malvales.—Stamens many, united into a column (or tube). Ovary 5-, or many-celled. Mucilaginous. Sepals united or free.

Orders.—31. Malvaceæ. 32. Sterculiaceæ. 33. Tiliaceæ.



Series. Discifloræ.—Sepals united. Petals free. Stamens $\frac{\text{hypo}}{\text{peri}}$ gynous. Disc present (also spelt as Disk).

Cohort. Geraniales.—Flowers pentamerous. Stamens obdiplostemonous. Disc conspicuous.

Orders.—34. Linaceæ. 38. Geraniaceæ. 39. Rutaceæ. 43. Meliaceæ.

Cohort. Celastrales.—Disc present. Ovule erect. Raphe ventral.

Orders.—49. Rhamnaceæ. 50. Ampelideæ.

Cohort. Sapindales.—Trees. Flowers minute. Ovules ascending.

Orders.—51. Sapindaceæ. 53. Anacardiaceæ.

Anomalous Order.—55. Moringaceæ.



Series. Calycifloræ.—Sepals united. Petals free, inserted on the calyx. Stamens $\frac{\text{peri}}{\text{epi}}$ gynous.

Pistil $\frac{\text{syn}}{\text{apo}}$ carpous or monocarpellary.

Cohort. Rosales.—Pistil monocarpellary or apocarpous. Placenta marginal.

Orders.—57. Leguminosæ. 58. Rosaceæ. 61. Droseraceæ.

Cohort. Myrtales.—Pistil syncarpous. Placenta axile (except Combretaceæ).

Orders.—65. Rhizophoræ. 66. Combretaceæ.

67. Myrtaceæ. 68. Melastomaceæ. 69. Lythraceæ. 70. Onagraceæ.

Cohort. Passiflorales.—Pistil syncarpous. Placenta parietal.

Orders.—74. Passifloreæ. 75. Cucurbitaceæ.

Cohort. Umbellales.—Flowers in umbels. Calyx-limb inconspicuous. Ovary inferior. 2-carpellary, 2-celled. Ovule 1 in each cell.

Order.—80. Umbelliferæ.

Sub-class. Gamopetalæ or Corollifloræ.—Sepals united. Petals united. Corolla on the thalamus. Stamens epipetalous.

Series. Inferæ, or Epigynæ.—Ovary inferior.

Cohort. Rubiales.—Sepals sometimes reduced. Ovary inferior, 2-5-celled. Leaves opposite or whorled; stipules interpetiolar.

Order.—84. Rubiaceæ.

Cohort. Asterales.—Flowers aggregated into dense masses or heads with much reduction in the calyx. Ovary inferior.

Order.—88. Compositæ.

Series. Superæ.—Ovary superior (except Vacciniaceæ and Maesa of Myrsineæ). Pistil syncarpous, of more than 2 carpels.

Cohort. Ericales.—Ovary more than 2-celled. Placentæ axile.

Orders.—92. Vacciniaceæ. 93. Ericaceæ.

Cohort. Primulales.—Stamens isomerous with, and opposite to, the petals. Ovary 1-celled. Placentæ free-central.

Order.—100. Myrsineæ.

Series. Bicarpellatæ.—Carpels 2, united. Stamens epipetalous.

Cohort. Gentianales.—Stamens equal to, and alternate with, the petals. Leaves opposite, decussate.

Orders.—104. Oleaceæ. 106. Apocynaceæ. 107. Asclepiadæ. 109. Gentianaceæ.

Cohort. Polemoniales.—Leaves alternate.

Orders.—112. Boragineæ. 113. Convolvulaceæ. 114. Solanaceæ.

Cohort. Personales.—Corolla irregular.

Stamens didynamous, 5 or 2. Carpels antero-posterior. Ovules many.

Orders.—115. Scrophulariaceæ. 122. Acanthaceæ.

Cohort. Lamiales.—Corolla bilabiate. Stamens didynamous.

Orders.—125. Verbenaceæ. 196. Labiatæ.

Sub-class. Incompletæ.—Perianth 1 whorl only: sepaloid or petaloid or 0.

Series. Curvembryæ.—Flowers hermaphrodite. Perianth single. Stamens as 'many as perianth lobes.

Orders.—128. Nyctagineæ. 130. Amaranthaceæ. 134. Polygonaceæ.

Series. Unisexuales.—Flowers unisexual.

Orders.—151. Euphorbiaceæ. 153. Urticaceæ.

Class. Gymnospermæ.

Orders.—165. Coniferæ. 166. Cycadaceæ. 164. Gnetaceæ.

Class. Monocotyledones.—Flowers 3-merous.

Series. Microspermæ.—Perianth 2-seriate.
Ovary 1- or 3-celled, inferior, with parietal or axile placenta. Seeds very numerous and minute, exalbuminous.

Order.—169. Orchideæ.

Series. Epigynæ.—Ovary inferior. Seeds albuminous.

Orders.—170. Scitamineæ. 174. Amaryllidaceæ.

Series. Coronariæ.—Ovary superior. Corona present in some orders.

Orders.—178. Liliaceæ. 183. Commelinaceæ.

Series. Calycinaæ.—Perianth sepaloid and coriaceous. Ovary superior.

Order.—187. Palmææ.

Series. Nudifloræ.—Perianth O. Ovary
superior.

Orders.—191. Aroideæ. 192. Lemnaceæ.

Series. Apocarpæ.—Pistil apocarpous.

Orders.—194. Alismaceæ. 195. Naiadaceæ.

Series. Glumaceæ.—Bracts of inflorescence
glumaceous. Flowers in spikelets.

Orders.—199. Cyperaceæ. 200. Gramineæ.

ANALYTICAL KEY TO COMMON NATURAL ORDERS OF BENGAL

- . *Class*—Dicotyledones. Flowers usually pentamerous, sometimes trimerous or tetramerous. Venation of leaf usually reticulate. Embryo with two cotyledons.

Sub-class—Polypetalæ. Flowers with calyx and polypetalous corolla.

Series—Thalamifloræ. Sepals free or united. Petals free, sometimes more than the sepals in number. Stamens hypogynous. Sepals, petals and stamens inserted on the thalamus. Pistil apocarpous or syncarpous.

N. O. 1. *Ranunculacete*.

Erect or climbing herbs or shrubs. Leaves radical or cauline and then alternate: simple or compound: opposite in *Clematis*; stipule 0. Flowers regular or irregular. Pistil apocarpous, carpels many. A high altitude Himalayan order.

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- (i) Erect or climbing shrubs. Leaves opposite. Sepals petaloid.

Petals absent ... *Clematis*.

Petals many, linear ... *Naravelia zeylanica*, Dc.

- (ii) Herbs. Leaves radical or alternate. Sepals petaloid.

Petals absent. Leaves ... *Thalictrum*
decompound. *Javanicum*, Bl.

- (iii) Herbs. Leaves radical or alternate. Sepals not petaloid.

Sepals 3, deciduous. ... *Ranunculus*
Petals 5. *sceleratus*, Linn.

- (iv) Flowers irregular. Ripe carpels dehiscent.

Posterior sepal spurred ... *Delphinium*.

Posterior sepal helmet-shaped. ... *Aconitum*.

... *Clematis*, Linn.

Woody climbing undershrubs. Leaves with twining petiole. Sepals 4-5. Stamens many. Carpels many, each with 1 pendulous ovule and long feathery style. Fruit a head of sessile or stalked achenes.

Clematis Cadmia, Ham.—A slender climber with ternately decom pound leaves and achenes without feathery style. East Bengal.

Clematis Gouriana, Roxb.—An extensive climber. Achenes with long feathery style. North Bengal.

Clematis Wightiana, Wall.—A large woody climber. Filaments hairy. Achenes with long feathery style. Orissa.

Delphinium, Linn.

Only one species is Khasian. *Delphinium altissimum*, Wall, at altitudes above 5,000 ft. The rest are Alpine, Himalayan, Tibetan and Sikkim species.

Aconitum, Linn.

An Alpine Himalayan poisonous genus. Here mentioned on account of the peculiar helmet-shaped posterior sepal concealing the two posterior hooded petals with long claw.

N. O. 2. *Dilleniaceæ*.

Trees. Leaves simple, alternate, petioles sheathing. Flowers yellow or white. Stamens.

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many. Carpels 5-20, free or united in the axis, styles distinct, *i.e.*, free. A tropical order.

Dillenia, Linn.

Trees with broad leaves which are strongly parallel-nerved. Flowers large. Stamens recurved, inner introrse, outer extrorse. Fruit globose formed of the ripe carpels inclosed in the much thickened calyx.

Dillenia indica, Linn.—A tall tree. Flowers solitary very large. Sepals fleshy accrescent in fruit. Inner stamens arching over the outer. The accrescent sepals are edible when cooked, fruit not edible. Leaves lanceolate, serrate. Planted.

Dillenia scabrella, Roxb.—A tree. Flowers fascicled, large, appearing when the tree is leafless. Carpels 5-7. Chittagong.

Dillenia pentagyna, Roxb.—A spreading tree with grey bark. Flowers umbelled, 5-8, appearing when the tree is leafless. Carpels 5. W. Bengal.

Dillenia aurea, Sm.—A spreading tree with grey bark. Flowers solitary, appearing when the tree is leafless. Carpels 8-12. N. Bengal.

N. O. 4. *Magnoliaceæ*.

Trees. Leaves simple, alternate; stipules 0 or conspicuous. Flowers solitary, axillary or terminal, large. Sepals 3, very deciduous. Petals 6-12, very deciduous. Stamens very many in many whorls. Carpels very many arranged spirally on the elongated conical thalamus (Gynophore), all free. Fruit of dehiscent or indehiscent ripe carpels. Seed with a long funicle.

A temperate and tropical Himalayan order.

The wood of the American and Australian genus *Drimys* looks like that of *Coniferæ*, and is bordered pitted.

(i) Stipules conspicuous. Gynophore sessile.
Magnolia.

(ii) Stipules conspicuous. Gynophore stalked.
Michelia.

Magnolia, Linn.

Evergreen or deciduous trees; buds enveloped in the stipules. Flowers large, terminal. Fruit of dorsally dehiscing persistent follicles on an elongated axis (carpellary region of the thalamus).

Magnolia sphenocarpa, Roxb.—An evergreen species. Buds globose. Carpels with very long beak. Chittagong.

Michelia, Linn.

Trees. Leaves as in *Magnolia*. Sepals petaloid, pale or orange yellow, 9-15 in all. The carpellary axis elongates considerably and bears the persistent ripe carpels which ultimately dehisce. Gynophore long stalked.

Michelia Champaca, L.—A tall elegant tree. Sepals broader than the petals, both of a golden yellow colour, 15-20 in all. Carpels pubescent. Cultivated.

N. O. 5. *Anonaceæ*.

Trees or shrubs, sometimes climbing by peculiar woody hooked and recurved branches which bear flowers (*Artabotrys*). Leaves simple, alternate; stipules 0. Sepals 3. Petals 3 or a multiple of 3 in whorls ; sepaloid in some. Stamens many closely packed on the thalamus ; filaments almost 0. Carpels many free. Fruit of free indehiscent ripe carpels often stalked. Albumen of seed ruminated. A tropical order. Not very common.

Artabotrys, R. Br.

Scandent shrubs. Leaves shining. Flowers solitary or geminate, or many on woody hooked and recurved peduncular branches. Sepals 3. Petals 6. Stamens many; connective truncate or produced. Carpels not too many. Thalamus flat or convex.

Artabotrys odoratissimus, R. Br.—A glabrous shrub with long branches. Flowers geminate or solitary on the hooked peduncular branches. Planted.

Saccopetolum, Bennett.

Trees. Leaves deciduous, pubescent. Flowers solitary or fascicled, axillary. Sepals 3. Petals 6, 2-seriate, *i.e.* in two whorls, outer series sepaloïd. Stamens many; connective much produced. Fruit of sub-globose long stalked ripe carpels.

Saccopetalum longiflorum, Hook. f. & Thoms.—A tree. Peduncles very short, solitary in the old axils. N. Bengal.

Saccopetalum tomentosum, Hook. f. & Thoms.—A large tree. Flowers in leaf opposed or sub-terminal cymes. Peduncles long. Behar.

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Polyalthia, Bl.

Trees or shrubs. Flowers solitary or several in the axils of present or of fallen leaves, or extra-axillary, or on woody tubercles. Sepals 3. Petals 6, 2-seriate, inner series vaulted or elongated. Anther cells remote, *i.e.* not lying closely. Thalamus convex. Fruit of berry like 1-seeded ripe carpels.

Polyalthia longifolia, Benth. & Hook. f.—A very tall tree. Leaves narrow lanceolate, apex tapering, margin undulate. Carpels longer than their stalk. An avenue tree. *Debdaru*.

Polyalthia suberosa, Benth. & Hook. f.—A small tree with corky bark; young branches spotted white. Leaves oblong obtuse. Flowers on a short woody extra-axillary tubercle. In forests of Bengal.

Anona, Linn.

Trees. Leaves very close set, alternate on slightly recurved narrow branches, lamina and branch being almost in the same plane. Sepals 3. Petals 3, sepaloïd; both thick and fleshy, triquetrous, *i.e.* triangular in cross section. Fruit of confluent ripe carpels on a more or less elongated carpellary axis.

Anona reticulata, Linn.—A small spreading tree. Leaves acuminate, peduncles 2-4 together. Areoles on the fruit not projecting. Very common. *Nona*.

Anona squamosa, Linn.—Leaves obtuse. Peduncles solitary. Areoles on the fruit projecting. Common. *Ata*.

N. O. 6. *Menispermaceæ*.

Climbing shrubs. Leaves alternate entire or lobed; stipules 0. Flowers unisexual, dioecious, very small. Staminate flowers (male): stamens usually antipetalous, filaments free or united, anthers free or united. Sterile carpels present or 0. Pistillate flowers (female): staminodes present or 0. Carpels free, 3 or 6-12, or 1. Ovule amphitropous, solitary. Ripe carpels drupaceous. Seed uniform with horse-shoe-shaped endosperm. A tropical order.

- (i) Sepals 6 ; petals 6 ; filaments free ; carpels 3. Drupes with a terminal stylescar. *Tinospora*.
- (ii) Petals 6, minute ; carpels 3-12 ; style not compressed ; seed horse-shoe-shaped. *Tiliacora*.

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- (iii) Petals 6, not minute ; *Cocculus*.
carpels 3-6 ; style and
seed as in (ii).
- (iv) Carpel 1 ; sepals 6-10, *Stephania*.
free ; petals 3-5, free ;
seed horse-shoe-shaped.
- (v) Carpel 1 ; sepals 4 ; petals *Cissampelos*,
of male flower 4, con-
nate, of female flower 1 ;
seed horse-shoe-shaped.

Tinospora, Miers.

Climbing shrubs with very long hanging unbranched aerial roots containing chlorophyll in the cortical and stellar tissue. Carpels 3, stigmas forked. Fruit of 1-3 drupes.

Tinospora tomentosa, Miers.—Leaves orbicular-cordate ; lobed.

Tinospora cordifolia, Miers.—Leaves cordate ; not lobed. Common.

Tiliacora, Colebr.

Tiliacora racemosa, Colebr.—A large climber. Filaments more or less cylindric ; anthers adnate, i.e. united. Rudimentary carpels of male flower 3. Carpels of female flower 9-12. Fruit of obovoid stalked drupes. Seed hooked.

Cocculus, D.C.

Cocculus villosus, D.C.—A tomentose climber. Petals auriculate. Stamens embraced by the petals.

Stephania, Lour.

Stephania hernandifolia, Walp.—A slender climber. Leaves peltate. Flowers in umbellate cymes. Filaments united in a column bearing the connate anthers around the top. Anthers 6, dehisce transversely. Carpel 1, style 3-6-partite. Fruit drupe-like.

Cissampelos, Linn.

Cissampelos Pareira, Linn.—A lofty climber. Leaves orbicular-reniform or cordate, peltate. Androecium as in *Stephania*. Anthers 4. Style 3-toothed, short. Fruit a drupe.

N. O. 7. *Berberideæ*.

Shrubs. Leaves simple or compound ; stipules present in *Berberis* only. Flowers yellow, fascicled, racemed or solitary. Sepals 6. Petals 6. Stamens 6, free. Dehiscence of anthers valvular (cf. N. O. Laurineæ) Carpels free 1-3;

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style short or 0. Chiefly temperate and mountain plants.

Berberis, Linn.

Stem erect, unbranched or not. Leaves pinnate compound, leaflets spiny along the margins; or simple. Anther cells open by longitudinally recurved valves along the two edges. Carpel 1. Fruit a few seeded berry-like ripe carpel.

Berberis nepalensis, Spreng.—Stem unbranched, leaves large, pinnate compound, crowded at the top of the stem. Racemes dense flowered, erect, shorter than the leaves. At Tung in the Darjeeling District and Khasi Hills.

Berberis vulgaris, L.—Stem branched. Leaves simple, spiny along the margins, deciduous. Racemes longer or shorter than the leaves, pendulous or sub-erect. A temperate Himalayan species. Host of *Puccinia graminis*, in spring, hence mentioned here.

N. O. 8. *Nymphæaceæ*.

• Aquatic perennial herbs. Leaves submerged and floating, peltate, margins involute. Flowers solitary on long scapes which do not bear leaves

or bracts, and the length of which is adjustable to the water level to hold the flower above water. The scape shortens after pollination and the fruit matures under water. The order shows a gradual transition of sepals to petals and of petals to stamens. The floral phyllotaxy up to the stamens is spiral. Sepals 4. Petals and stamens indefinite. Carpels many, sunk in the tissue of the thalamus. A tropical order ; acclimatisable to temperate conditions.

Nymphæa, L.

Thalamus ovoid. Carpels connate (*i.e.* united with one another) and sunk in the tissue of the thalamus forming one ovary, crowned by the connate, radiating furrowed stigmas, each with a horny appendage.

Nymphæa lotus, L.—Leaves sharply sinuately toothed. Sepals ribbed. Anthers without appendages. Stigmatic appendages club-shaped. Flowers white. Common in tanks. *Shalook*.

Nymphæa stellata, Willd.—Leaves entire or obtusely sinuate. Sepals not ribbed. Anthers appendaged. Stigmatic appendages very short. Flowers pale blue. Common.

Nelumbium, Willd.

Thalamus top-shaped or turbinate. Carpels free, obovoid, irregularly sunk in pits on the top of the thalamus, stigmas projecting, dilated ; style very short.

Nelumbium speciosum, Willd.—Leaves peltate. *Padma*. Common in tanks and marshes in villages. Successfully grown in Lloyd Botanic Garden, Darjeeling, under the supervision and care of Mr. S. N. Basu, Curator.

N. O. 10. *Papaveraceæ*.

Annual herbs with milky latex. Sepals very caducous, falling off together before the flower opens. Stamens infinite. Carpels 2, united ; ovary 1-celled, superior ; placenta parietal ; style 0, or very short. Fruit dehisces by apical pores. A temperate order.

Papaver, Linn.

Sepals 2. Petals 4. Capsules globose ; stigmas sessile radiating from the centre of the top of the capsule which is short and truncate. Seeds many.

· *Papaver somniferum*, Linn.—Cultivated. The latex from the pericarp yields opium and the seeds are edible. The Opium Poppy.

Argemone, Linn.

Sepals 3. Petals 6. Stigma not sessile. Fruit a longish capsule, somewhat pointed.

Argemone mexicana, Linn.—A prickly herb in waste places. Flowers yellow. Leaves prickly.

N. O. 10a. *Fumariaceæ*.

Herbs with watery juice. Stamens 4, in two lateral bundles, in each bundle the central stamen has a complete anther (i.e. 2-lobed) and the two lateral ones have half an anther each. Carpels 2, united into a 1-celled superior ovary with only 1 fertile parietal placenta.

Fumaria parviflora, Lamk.—A small branched annual weed with much divided glaucous leaves.

N. O. 11. *Cruciferae*.

Annual or biennial herbs. Leaves radical in a rosette or cauline alternate, entire, pinnately lobed or lyrate ; stipule 0. Flowers in racemes.

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Sepals 4, free, in two pairs at right angles. Petals 4, in two pairs at right angles, clawed. Stamens 6, tetra-dynamous, *i.e.*, in two whorls of which the outer has 2 short and the inner has 4 longer stamens ; small round glands alternate with stamens. Carpels 2, united in a superior 1-celled ovary at an early stage, which becomes 2-celled by a false placental septum (replum) as the ovary matures. Placentæ 2, parietal. Fruit a 2-valved pod, or siliqua, *i.e.*, a capsule which dehisces into the two constituent carpels from below upwards. A temperate order. None of the species is poisonous.

Pods narrow, long or short. *Nasturtium.*

Sepals spreading, not
saccate. Flowers yellow.

Pods flat, acute. Flowers *Cardamine*
white or purple. (rare).

Stigma capitate, truncate or *Brassica.*
2-lobed. Pod with a beak.

Pods long, indehiscent, terete, *Raphanus.*
i.e., circular in cross
section. Sepals saccate.

Nasturtium, R. Br.

Branched herbs. Leaves entire, lobed or pinnatifid. Flowers small capsule subcylindric. Style short stout, or long slender ; stigma entire or 2-lobed. Replum transparent.

Nasturtium indicum, D.C.—Bracts 0. A very common weed. The name of this genus is often confounded with the Garden *Nasturtium* which belongs to the genus *Tropaeolum* of Geraniaceæ.

Brassica, Linn.

Herbs with somewhat woody root-stock. Leaves large, often lyrate or pinnatifid. Flowers yellow in long racemes. Sepals erect or spreading, the two lateral are saccate at the base.

Brassica juncea, Hook. f. & Thoms.—A cold-weather crop. Stems elongate ; leaves at the base quickly withering, cauline leaves lyrate. The Mustard ; Bengali *Rai Sarisha*.

Brassica rugosa, Prain, var. *Cuneifolia*.

A cold-weather crop. Stems short until flowering ; leaves at the base persisting to form a loose cabbage ; cauline leaves not lyrate.

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Brassica campestris, Linn.—An erect, stout, simple or branched annual herb. Lower leaves lyrate, upper auricled. Flowers corymbose, beak of pod seedless.

Brassica campestris, Linn., var. *Sarson* = Subsp. *Napus*, Linn.—Root fusiform, leaves all glabrous and glaucous, i.e., covered with a kind of bloom. Petals deciduous before the corymb lengthens. Bengali *Swet Sarisha*.

Brassica Napus, Linn. var. *dichotoma*.—Leaves less lobed and smaller than in the preceding. *Lutni sarisha* of Chota Nagpur.

Brassica oleracea and its various cultivated forms are known as Cabbage, Cauliflower, etc.

Raphanus, Linn.

Herbs. Leaves lyrate-pinnatifid. Flowers large, yellow or white. Petals clawed. Fruits constricted at intervals with a long tapering beak.

Raphanus sativus, Linn.—The Radish.

N. O. 12. *Capparidæ*.

Herbs, often with glandular pubescence. Gynæcium and andrœcium on a gynandrophore.

Stamens many or few. Carpels united into a superior 1-celled ovary with 2-4-parietal placentas.

- (i) Stamens 6, or more ; *Cleome*.
gynandrophore 0.
- (ii) Stamens 6, gynandro- *Gynandropsis*.
phore prominent.
- (iii) Stamens many ; an- *Capparis*.
drophore 0, gyno-
phore long filiform.

Cleome, Linn.

Herbs. Leaves simple or digitately compound. Stamens 6-12 ; androphore and gynophore 0.

Cleome viscosa, Linn.—A herb with viscid pubescence, *i.e.* with short, glandular hairs. Leaves digitately compound.

Gynandropsis, D.C.

Sepals 4. Petals 4, long clawed. Stamens 6. Androphore long slender. Ovary on a short gynophore.

Gynandropsis pentaphylla, D.C.—Leaves digitately 5-foliolate.

Capparis, Linn.

Trees or shrubs. Leaves simple. Sepals 4, Petals 4 not clawed. Stamens very many.

Ovary on a long filiform gynophore; style 0; stigma like a small knob; the ovary on its gynophore is often mistaken by beginners for a stamen.

Capparis horrida, Linn.—Shrubs with broad-based recurved thorns. Young leaves and shoots brown tomentose. Flowers supra-axillary, and several together in vertical lines, white or purple.

N. O. 15. *Violaceæ*.

Herbs or shrubs, erect or not. Leaves alternate. Flowers irregular. Sepals produced at the base beyond their insertion in the genus *Viola*; certain species of *Viola* are cleistogamic. Anthers connate or free. Ovary 1-celled, tri-carpellary.

Ionidium suffruticosum, Ging.—A small branching perennial herb. Flowers axillary, orange or purple. Sepals 5, not produced at the base. Petals 5, lower larger, clawed, saccate or spurred at the base. Anthers free or connate, some spurred.

N. O. 17. *Bixineæ*.

Trees. Leaves with oil glands, alternate, simple. Flowers regular. Sepals and petals of

the same number, or petals 0. Ovary superior, 1-celled ; placenta parietal. A tropical order.

Taraktogenos Kurzii, King.—Flowers 1-sexual. Male sepals 4, petals 8, each with a basal gland. Stamens 20-32, anthers deeply cordate. This species yields the Chaulmoogra seed and Chaulmoogra oil of commerce.

N. O. 20. *Polygalaceæ*.

Leaves simple, entire, or 0. Flowers irregular ; pedicel jointed, bracteate and 2-bracteolate. Sepals 5, 2 are wing-like and petaloid. Petals 5 or 3. Stamens 8 ; filaments united in a cleft sheath. Ovary superior, 2-celled ; placenta axile. fruit capsular.

Polygala chinensis, Linn.—An annual diffuse and decumbent herb. Petals 3. Ovary 2-celled. Ovule solitary in each cell, pendulous. Capsule suborbicular.

N. O. 22. *Caryophyllaceæ*.

Herbs with opposite jointed branches. Leaves apposite, petals clawed. Stamens 10, in two whorls, the outer antipetalous and epipetalous. Ovary superior, 1-celled ; styles 2-5, free or united ; placenta free-central. Fruit capsular. A cosmopolitan order.

Styles free

Petals entire, capsule 1-seeded *Brachy-
stemma*.

Petals lacerate, capsule many-
seeded. *Arenaria*.

Styles united

Petals 2-6-fid *Drymaria*.

Brachystemma calycinum, Don.—A diffuse herb. Stem 4-angled, brittle. Leaves triple-nerved. Stamens 10, 5 without anthers. Ovary 1-celled: styles 2. Kurseong.

Arenaria serpyllifolia, Linn.—An excessively branched annual; branches suberect. Cymes many-flowered. Bracts leafy. Sepals ribbed, hairy. Senchal.

Drymaria cordata, Willd.—A diffuse branched shrub. Sepals 5. Petals 5, 2-lobed. Stamens 5. Ovary 1-celled; style 3-fid. Kurseong.

N. O. 23. *Portulacaceæ*.

Wiry decumbent succulent herbs. Stem prostrate, with growing apex ascending; sometimes rooting at nodes and with hairy appendages at the nodes. Leaves opposite. Flowers solitary terminal, yellow. Fruit a circumscissile capsule. Ovary half-inferior.

Portulaca oleracea, Linn.—Leaves flat, cuneate-oblong. Stem not rooting at nodes. Nodal appendages scarious or 0.

Portulaca quadrifida, Linn.—Stem diffuse, filiform rooting at the nodes. Nodal appendages many. Leaves flat, ovate-lanceolate. Very common on roadsides and in waste places.

N. O. 27. *Guttiferæ*.

Trees, abounding in a yellow or greenish juice. Leaves opposite with many close lateral veins. Sepals and petals, 2-6. Stamens indefinite. Ovary superior with a slender style. Stigmas free or united. Fruit baccate, *i.e.* berry-like.

Ovary 2 or more celled. ... *Garcinia*.

Leaves not strongly nerved.

Ovary 1-celled. Petals present ... *Calophyllum*.
or not. Leaves strongly
nerved.

Garcinia, Linn.

Trees with yellow juice. Gamhoge, the yellow pigment of commerce is obtained from *Garcinia Morella*, Desr. Stamens indefinite, variously united. Flowers male, female or hermaphrodite.

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Garcinia Morella, Desr.—A tree, 30-50 ft. Leaves thick; veins very oblique, indistinct. Petals larger than the inner sepals. Stamens many, united into a subglobose mass. Ovary subglobose; stigma large 4-lobed, sessile. Forests of East Bural. Khasi Hills.

Garcinia Mangostana, Linn.—Native of Malayan Peninsula. The fruit is Mangostene. The edible portion is the aril of the seed.

Calophyllum, Linn.

Trees. Leaves shining. Veins many, close set, parallel and at right angles to the midrib. Stamens many, free or filaments united at the base only.

Calophyllum spectabile, Willd.—A tall tree. Sepals 4. Petals 0. Young shoots rusty tomentose, quadrangular. Veins of leaves equally prominent on both surfaces. Sibpur.

Calophyllum inophyllum, Linn.—A tree. Sepals 4. Petals 4. Bark grey. Leaves shining on both surfaces. Stamens numerous, filaments in 4 bundles. Ovary stalked; style long; stigma peltate.

N. O. 28. *Ternstræmiaceæ*.

Shrubs or trees. Flowers not small, subtended by 2 sepal-like bracts. Stamens infinite, free or connate, adnate to the base of the deciduous corolla. Ovary superior, 3-5-celled; styles as many.

Camellia theifera, Griff., is the Tea plant.

N. O. 29. *Dipterocarpeæ*.

Big trees. Flowers in panicles. Calyx accrescent, all the 5 lobes grow out into wings in *Shorea*, or 2 lobes only grow out into wings in *Dipterocarpus*. Stamens many, free or adnate to the base of the petals. Ovary superior, slightly immersed in the thalamus. Fruit like a nut in the calyx-tube and carried in it by the wings derived from the calyx-lobes at the time of dispersal; such fruits are called samaroid.

Shorea robusta, Gaertn.—Resinous trees, very tall. Leaves ovate-oblong, cordate acuminate. Stamens 50; anthers with a bearded appendage. Segments of fruiting-calyx unequal. The Shāl tree.

N. O. 31. *Malvaceæ*.

Herbs—trees, mucilaginous in young parts, leaves and flowers. Leaves simple or compound.

Flowers 5-merous, axillary solitary, or cymose paniculate. Calyx with an involucre of bracteoles known as the epicalyx. Stamens numerous, monadelphous; the united filaments forming a staminal tube, 5-toothed at the apex, concealing the gynaecium; anthers 1-lobed, reniform. Gynæcium syncarpous; ovary superior, 5-celled; style 1, divided into 5 arms at the top; stigmas 5, capitate, peltate or linear. Fruit loculicidal.

Staminal tube not toothed at the apex.

• Style-arms as many as the carpels.

No epicalyx *Sida*.

Style-arms twice as many as the carpels.

Carpels spiny *Urena*.

Carpels not spiny *Malachra*.

Staminal tube 5-toothed or truncate at the apex. Epicalyx present. *Hibiscus*.

Style undivided at apex.

Bracteoles of epicalyx small *Thespesia*.

Bracteoles of epicalyx large, cordate. *Gossypium*.

Staminal tube divided above the base into several bundles of filaments. *Bombax*.

Sida, Linn.

Herbs or undershrubs. Leaves simple, entire or lobed. Petals 5-connate at the base and adnate to the base of the staminal tube. Anthers crowding towards the top of the staminal tube. Carpels 5 ; styles 5, free. Fruit of ripe carpels separating away from the axis.

Sida rhombifolia, Linn.—A variable perennial, very common. Flowering before noon.

Urena, Linn.

Herbs or undershrubs, with rigid stellate hairs. Leaves angled. Flowers clustered. Epicalyx of 5 bracteoles. Petals coherent at base and adherent to the base of the staminal tube. Anthers not crowding at the top of the staminal tube, they are almost sessile. Ovary 5-celled, style 1, stigma 10. Fruit of ripe carpels ultimately separating from the axis and covered with hooked bristles, or not.

Urena lobata, Linn.—A variable herb. Leaves rounded angled, cordate.

Urena sinuata, Linn.—Leaves divided beyond the middle into 5 oblong lobes which are serrated and have glands on the nerves on the lower side.

Malachra, Linn.

Herbs. Leaves angled. Flowers in dense heads with intermixed bracteoles. Carpels 5. Styles 10, free almost from base. Other characters as of *Urena*.

Malachra capitata, Linn.—Petiole of leaf about 4 in.; blade much wider than in *Urena lobata*.

Hibiscus, Medik.

Herbs, shrubs or trees. Leaves entire, toothed or lobed. Epicalyx prominent. Petals connate at the base and adnate to the base of the staminal tube. Anthers near the top of the staminal tube which is 5-toothed at apex, and are reniform, 1-lobed. Ovary 5-celled; style 1, branched at the top into 5 arms; stigma 5.

Hibiscus rosa-sinensis, L.—Flowers long stalked, stalk jointed near the middle. Called shoe-flower, as these are used to black shoes. To the Hindus however it is a sacred flower.

Hibiscus vitifolius, Linn.—Herbs with cordate leaves, tomentose; petiole $2\frac{1}{2}$ in. Capsule 5-winged.

Hibiscus esculentus, Linn.—Herbs with elongated, conical 7-angled capsule. The *Dheras*.

Thespesia, Corr.

Tall trees. Flowers axillary. Epicalyx not adherent to calyx. Calyx truncate, staminal tube toothed at apex. Style undivided. Fruit loculicidal.

Thespesia populnea, Corr.—Young parts covered with peltate scales. Leaves entire, ovateacute, 3 in. in diameter.

Gossypium, Linn.

Low trees. Peduncles jointed, axillary, 1-flowered. Flowers large. Epicalyx of 3 bracteoles which are large and leafy. Petals spreading. Style undivided. Fruit loculicidal. Seeds densely woolly.

Gossypium herbaceum, L. is the Cotton tree. Leaves cordate, lobes broadly ovate acuminate, with a gland on the midrib on the under surface. Bracteoles as long as the capsule.

Bombax, Linn.

Trees, armed with prickles. Leaves digitately compound, deciduous, *i.e.* fall away all at one time and the tree becomes leafless when flowering. Flowers large, axillary, solitary or clustered.

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Epicalyx 0. Calyx leathery, truncate, cup-shaped. Stamens monadelphous below, pentadelphous above, ultimately divided into numerous filaments. Ovary superior, 5-celled. Capsule loculicidal ; the valves leathery, woolly inside.

Bombax malabaricum, D.C.—A large deciduous tree with spreading branches. Leaves large, leaflets about 1 ft. long ; petiole longer than leaflets. Flowers crowding near the ends of the branches. The *Simool*.

N. O. 32. *Sterculiaceæ*.

Trees. Somewhat mucilaginous. Flowers in cymose panicles, unisexual (in *Sterculia*) or hermaphrodite (in *Pterospermum*, etc.). Stamens many, monadelphous forming a tubular or solid staminal column bearing the ovary at the top in the hermaphrodite species. Anthers 2-celled. Pistil in the hermaphrodite species is syncarpous and the ovary 5-celled ; fruit a loculicidal capsule. In the unisexual species the pistil is syncarpous of 5 carpels united by their styles only, ovaries free ; fruit of follicles.

Flowers unisexual. Stamens ... *Sterculia*.
many, petals 0.

Flowers unisexual. Stamens ... *Heritiera*.
5, petals 0.

Flowers hermaphrodite. Staminal column dilated
above, bearing anthers on the margin.

Anthers stipitate ... *Kleinhovia*.

Capsule woody ... *Helicteres*.

Capsule woody. Seeds... *Pterospermum*.
winged.

Staminal tube not dilated ;... *Dombeya*.
antheriferous at the top.

Petals persistent.

Sterculia, Linn.

Trees or shrubs. Leaves simple or digitately compound. Flowers unisexual or hermaphrodite. Calyx tubular, 4-5-parted, *i.e.*, calyx limb divided into 4 or 5 segments. Petals 0. Staminal column bears a ring of sessile anthers. Pistil on the staminal column ; carpels 4-5, united by their styles which are free above. Fruit of ripe stipitate carpels which are follicular, *i.e.* dehisce by their ventral suture only. Seeds winged in some species, *e.g.* *Sterculia alata*, Roxb.

Heritiera, Aiton.

Trees. Leaves simple, scaly on the under-surface. Flowers small, unisexual. Petals 0.

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Anthers in a ring on the top of the column. Ovaries almost free united by the style which is short ; stigmas 5, thick. Ripe carpels woody, indehiscent.

Heritiera Fomes, Buch. }.—This is the Sundri
= *H. minor*, Roxb. }
occurring plentifully in the Gangetic delta. Hence
the name Sunderbuns.

Kleinhovia, Linn.

Trees. Leaves quite entire. Inflorescence terminal. Epicalyx present. Sepals and petals present. Staminal column dilated above into a bell-shaped cup. Ovary in the staminal cup. Style slender ; stigma 5-fid. Fruit a membranous loculicidally 5-valved capsule.

Kleinhovia Hospita, Linn. is the only species.

Helicteres, Linn.

Trees or shrubs. Leaves simple. Petals 5, clawed, the claws with appendages. Ovary at the top of the staminal column, 5-lobed, 5-celled. Styles short united below. Fruit of 5 follicles which are spirally twisted or not.

Helicteres Isoral, L.—Calyx irregular, somewhat 2-lipped. Petals very unequal. Stamens 10.

Staminodes 5. Fruit cylindric beaked, pubescent, made up of 5 spirally twisted ripe carpels which eventually separate away and dehisce. Some people in Bengal have the superstition that these fruits have the influence of warding off evil spirits which haunt about confinement rooms where newly born babes are brought up.

Pterospermum, Schreb.

Trees. Leaves simple, covered with close-set scales. Flowers on axillary and terminal peduncles. Petals 5, deciduous with the calyx. Staminal column short, bearing 5 groups of linear anthers, 3 in each group, the 5 groups alternating with 5 ligulate staminodes.

Pterospermum acerifolium, Willd.—A large tree. Leaves roundish or oblong, cordate, palmately nerved, often peltate, silvery pubescent beneath ; petiole long. Calyx in bud rusty tomentose outside. Flowers fragrant. Sepals hairy inside, long, linear-oblong, recurved. Petals white, as long as, or shorter than, sepals, erect. Staminodes club-shaped. Ovary superior, 5-angled, 5-celled. Capsule woody stipitate, ovoid, angled, loculicidal. Seeds winged. The *Kanak Chāmpā*.

Pterospermum semisagittatum, Ham.—Leaves

oblong-lanceolate, sagittate at base, auricled on one side. Capsule not angled.

N.B.—The situation of the pistil on the staminal column suggests the existence of a gynophore to which the staminal sheath, *i.e.* the tube formed by the united filaments of the stamens, is adherent. So that the “staminal column” is morphologically the gynophore together with the adherent staminal sheath. This is clear from the figure of *Sterculia* flower on page 285 of *Descriptive and Analytical Botany* by Emm. Le Maout and J. Decaisne, and from the generic characters of *Helicteres* in Bentham and Hooker’s. *Genera Plantarum*.

N. O. 33. Tiliaceæ.

Herbs or shrubs. Somewhat mucilaginous. Sepals united, or free. Stamens definite, free, or very slightly united at the base into several bundles (polyadelphous). Anthers 2-celled. Disc present, glandular hypogynous. Fruit capsular or drupaceous.

Sepals free. Petals glandular at the base

Fruit without prickles.....*Grewia*

Fruit prickly.....*Triumfetta*

Sepals free. Petals not glandular.....

Corchorus.

Grewia, Linn.

Trees or shrubs. Leaves entire 1-9-nerved. Ovary superior, 2-4-celled ; style subulate, *i.e.* awl-shaped ; stigma shortly lobed. Fruit a drupe, fleshy or fibrous.

Grewia asiatica, Linn.—Leaves roundish, coarsely toothed sub-acuminate. Flowers 2 or more, axillary, on peduncles. Drupe globose, pilose, edible. The *Phalsa*.

Triumfetta, Linn.

Herbs or undershrubs. Leaves serrate, lobed or not. Flowers in dense cymes. Sepals 5. Petals 5. Stamens few or many. Ovary 2-5-celled ; style filiform ; stigma 5-toothed. Fruit capsular or indehiscent, spiny or bristly.

Triumfetta rhomboidea, Jacq.—Herbs. Leaves rhomboid. Fruit capsular, small, with hooked spines.

Corchorus, Linn.

Herbs or undershrubs. Flowers small, axillary, peduncled. Sepals 4-5. Petals 4-5. Stamens free, many. Ovary 2-6-celled ; style short, stigma cup-shaped. Fruit capsular, elongated, smooth or prickly. Seeds numerous.

Corchorus capsularis, Linn.—Leaves oblong acuminate, base prolonged into tail like appendages. Capsule not elongated. The Jute.

Series.—Discifloræ. Sepals united. Petals free.

Disc prominent. Stamens $\frac{\text{hypo}}{\text{peri}}$ gynous.

(Disk or Disc—F. B. 1. Vol. II, p. 665, Vol. III, p. 621.)

N. O. 34. *Linaceæ*.

Herbs or shrubs. Leaves alternate, simple, entire (3-nerved in *Erythroxylon Coca*, the cocaine-yielding plant, foreign—S. America). Sepals 5. Petals 5. Stamens 5, or 10 of which 5 are smaller and 5 longer, alternating; filaments united into a hypogynous ring or cup. Ovary superior, entire, 3-5-celled; styles 3-5, free or united. Fruit capsular.

Linum usitatissimum, Linn.—Herbs. Stamens 5 with 5 alternating staminodes. Ovary 5-celled. Style free. A cold-weather crop. *Tishi*, *masina*.

N. O. 38. *Geraniaceæ*.

Herbs, rarely trees, usually glandular pubescent. Leaves simple or compound. Flowers regular or irregular. Sepals and petals isomerous.

Stamens as many as sepals or more, sometimes fewer by suppression; filaments free or connate at the base into a ring. Ovary superior, 3-5-celled; styles as many as cells of ovary, free or united. Sometimes carpels are beaked and the beaks united lengthwise with a prolongation of the thalamus called the carpophore. Fruit capsular, valves separating elastically, curling up from below upwards in the case where a carpophore exists (*e.g.* *Geranium*). Disc-glands present. A temperate order.

In the North-West Indian and Tibetan genus *Erodium* the fruit is a septifragal capsule and long-beaked. The beak bears 5 styles. After separating from one another the ripe carpels remain indehiscent and their long hairy style-bearing beak shows a twisting movement when wetted. This is due to the hygroscopic nature of the beak.

Leaves simple, deeply palmately or reniformly lobed.

Carpels beaked, forming with the prolonged thalamus a Carpophore.

Perfect stamens 10 ... *Geranium*

Perfect stamens 5, staminal nodes 5

... *Erodium*

Leaves compound, disc glands 0.

Herbs. Fruit capsular.

Fruit valves cohering with the axis...*Oxalis*

Fruit valves free from the axis...*Biophytum*

Trees. Fruit indehiscent ... *Avèrrhoa*

Leaves simple, not deeply lobed.

Flowers irregular, Herbs... *Impatiens*

The American genus *Tropaeolum* shows Median proliferation. See Linnean Society's Proceedings No. 507, dated 7th November 1929.

Geranium, Linn.

Herbs. Leaves opposite or alternate, pentagonal, deeply 3-5-lobed upper sessile segments rhomboid incised. Flowers regular, axillary, solitary or 2 together on a peduncle or several in an umbel. Sepals and petals, 5 each ; glands 5.

Geranium nepalense, Sweet. Senchal.

Oxalis, Linn.

Acid herbs. Leaves radical, palmately compound, 3-foliolate. Flowers on long peduncles. Disc glands 0. Stamens 10, free or united. Ovary 5-celled, superior ; styles 5, free, capsule loculicidal, valves not separating away from the carpophore.

Oxalis corniculata, Linn.—A diffuse creeping weed, edible. Leaves long petioled. Flowers sub-umbellate, yellow ; fruiting pedicels depressed. *Amrool Sak*.

Biophytum, DeCand.

Annual herbs. Leaves pinnately compound ; leaflets oblique, small, many, close-set ; whorled at the top of the stem. Peduncles terminal, pedicels umbelled. Stamens 10, free.

Biophytum sensitivum, Dc.—Hispidly pubescent herb with 6-15 pairs of leaflets. Sepals much exceeding the capsule. Stem unbranched.

Biophytum Reinwardtii, Walp.—Peduncles slender ; leaflets 10-20 pairs ; sepals not longer than the capsule.

Averrhoa, Linn.

Trees. Leaves alternate, pinnately compound. Flowers small, regular, in paniced axillary or ramal cymes. Sepals and petals 5. Glands 0. Stamens 10, filaments united at the base. Ovary without beak, 5-lobed, 5-celled ; styles 5, free. Fruit berry-like.

Averrhoa Carambola, Linn.—Leaflets 2-5 pairs. Fruit 3 in. long, yellow, with acutely angled lobes, edible. *Kāmraṅgā*.

Impatiens, Linn.

Herbs. Leaves simple, opposite or alternate. Flowers irregular, resupinate (upside down), 1-2 or many on axillary peduncles. Sepals 3, one largest and spurred. Petals 3, one largest. Stamens 5; anthers united. Disc 0. Ovary oblong, 5-celled ; style 0; Stigma 5-toothed. Capsule loculicidal, valves elastically springing away.

A very difficult genus consisting of about 150 species.

N. O. 39. *Rutaceæ*.

Shrubs or trees. Leaves simple or compound, alternate, with essential oil glands as transparent dots when looked through against light. The glands also occur on sepals and petals. Sepals, petals and stamens, 4-5 each; or stamens 6 or 10, or more. Ovary Superior, unlobed ; carpels free towards the base or altogether free ; style short, stigma stumpy. Fruit capsular, baccate or a drupe. Disc prominent.

Herbs. Petals 4. Stamens 6.....

Boenninghausenia.

Trees. Stamens 3-5. Armed.....

Zanthoxylum.

Shrubs. Leaves simple, unarmed.....

Skimmia.

Shrubs. Leaves not simple. Unarmed.....

Glycosmis.

Shrubs. Leaves not simple. Unarmed. Style articulated and not persistent.....

Micromelum.

Ditto. Petals not valvate.....*Murraya.*

Stamens 20-60. Leaves 1-foliolate.....*Citrus.*

Stamens 30 or more. Leaves 3-foliolate.....

Aegle.

Boenninghausenia, Reich.

Boenninghausenia albiflora, Reich.—A slender erect perennial herb. Leaves alternate ; 2-3-pinnate ; petiole slender ; leaflets small, obovate, apex notched. Flowers pure white in leafy cymes. Ovary long stipitate, *i.e.* stalked, deeply lobed, narrowed below. Fruit dehiscing into a few follicles.

Zanthoxylum, Linn.

Trees. Armed with stout prickles. Leaves alternate ; pinnate compound. Flowers small in peduncled cymes, often unisexual. Ovary of 1 carpel, or of more than one and then carpels almost free. Fruit of 1 or more ripe carpels, coriaceous or fleshy.

Zanthoxylum alatum, Roxb.—A shrub with dense foliage and pungent aromatic taste and smell. Leaves $1\frac{1}{2}$ -9 in.; petiole narrowly winged with 2 stipular prickles at the base.

Skimmia, Thunb.

Skimmia Laureola, Hook. f.—Small strong-scented shrub. Leaves exceedingly variable in size and shape, often caudate acuminate. Ovary 2-5-celled ; style 0, or short. Fruit a drupe.

Glycosmis, Correa.

Glycosmis pentaphylla, Correa.—Leaves 1-foliolate or imparipinnate. Stamens 8-10, free ; filaments dilated below ; anthers often with a gland. Ovary 2-5-celled, minute, ovoid.

Micromelum, Blume.

Micromelum pubescens, Blume.—Unarmed trees. Leaves imparipinnate ; leaflets oblique. Flowers in large terminal corymbose panicles. Stamens 10, free. Fruit a dry berry.

Murraya, Linn.

Murraya exotica, Linn.—Shrubs. Leaves pinnate. Stamens 10 inserted around an elongated

disc. Flowers in axillary corymbs or cymes, Filaments subulate. Ovary 2-5-celled; style articulated and deciduous. Fruit an ovoid berry.

Citrus, Linn.

Spinous shrubs. Leaves alternate 1-foliolate ; petiole winged. Petals 4-8, thick. Stamens many, inserted around a large cupular disc ; filaments compressed at the base, connate. Ovary many-celled ; style stout ; stigma capitate. Fruit loosely called a berry in systematic books. The pulp consists of fleshy spindle-shaped parenchymatous cells derived from the placenta and is divided into the so-called cells by infoldings of the endocarp.

Citrus medica, Linn.—Young shoots glabrous. Wing of petiole narrow or absent. Fruit mamillate at the apex.

Citrus medica, Linn. var. *acida* is the Sour Lime of India.

Citrus Aurantium, Linn.—Trees. Wing of petiole broad. Fruit not mamillate. The Orange.

Aegle, Correa.

Aegle Marmelos, Correa.—Spinous trees. Leaves deciduous. New foliage and flowers

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simultaneous. Leaflets 3-5, 2 lateral sessile, terminal long petioled. Flowers large, white, axillary. Stamens many; disc not prominent. Fruit large, globose, rind woody, meso- and endo-carp pulpy and fibrous, edible. The *Bael* tree.

N. O. 43. *Meliaceæ*.

Trees. Leaves alternate, pinnate compound; leaflets entire or toothed, oblique at base. Calyx 3-6-lobed. Petals 3-6. Stamens 4-12; filaments connate in a tube, or free. Disc hypogynous, tubular. Ovary superior, 2-5-celled; style single, stigma capitate. Fruit dehiscent or not.

Leaflets toothed. Stamens united
into a tube.....*Melia*
Leaflets entire. Stamens united into
a tube.....*Amoora*
Stamens free, few.....*Cedrela*

Melia, Linn.

Trees. Leaves 1-2-3-pinnate; pubescence stellate-mealy. Calyx 5-6-lobed. Petals 5-6. Staminal-tube cylindrical, dilated at base and apex, striated and toothed; anthers 10-12. Fruit a drupe.

Melia Azadirachta, Linn.—Lofty trees with a

straight trunk. Leaves once pinnate ; leaflets sub-falcate serrate. The *Neem*.

Melia Azedarach, Linn.—Leaves twice or thrice pinnate.

Amoora, Roxb.

. Trees. Leaves once pinnate ; leaflets quite entire. Staminal tube sub-globose or campanulate. Disc inconspicuous. Capsule sub-globose.

Amoora Rohituka, W. & A.—An evergreen tree with a large crown of branches.

Cedrela, Linn.

Cedrela Toona, Roxb.—Tall trees with coloured wood. Inflorescence drooping. Flowers fragrant. Petals ciliate ; used for dyeing. Stamens 5 ; staminodes may be present. The *Toon*.

N. O. 49. *Rhamnaceæ*.

Shrubs, erect or scandent ; branches with spines. Leaves simple alternate, coriaceous, 3-5-nerved ; stipules prickly. Flowers small, greenish in dense axillary cymes. Sepals, petals and stamens 4-5 ; stamens antipetalous and enclosed within the folds of the petals. Disc fleshy lining

the calyx-tube. Ovary superior. Fruit is a fleshy drupe, or, dry and samaroid.

Zizyphus Jujuba, Lamk.

N. O. 50. Ampelideæ.

Climbing herbs by tendrils (*e.g.* *Vitis*). Flowers minute; calyx very short, truncate; petals operculate, *i.e.* fall away very early in one piece ; or, erect herbs with very large leaves simple or compound on sulcate branches (*e.g.* *Leea*, frequently found on the Darjeeling-Himalayan Railway above Sukna Station).

N. O. 51. Sapindaceæ.

Big trees. Leaves pinnate, palmate or simple. Flowers regular or irregular, small, in dense cymes. Sepals equal or unequal. Petals equal or unequal, bearded at the base on the inside, or with scales. Stamens 5-10, inserted inside, outside or on the disc. Ovary superior, entire or 2-3-lobed. Fruit capsular or indehiscent or a double samara (*Acer*). Seeds arillate.

Stamens inserted inside the disc. Seeds exalbuminous.

Fruit capsular *Cardiospermum*

Fruit indehiscent.

Lobes of fruit oblong.

Leaves pinnate.....*Erioglossum*

Leaves 3-foliolate.....*Allophylus*

Lobes of fruit 1 or rarely

2-tubercled.....*Nephelium*.

Cardiospermum, Linn.

Cardiospermum Halicacabum, Linn.—Climbing herbs with wiry stem. Leaves alternate, 2-ternate. Flowers irregular in axillary racemes, the lowest pair of pedicels transformed into tendrils. Sepals 4. Petals 4. Stamens 8, excentric. Disc unilateral. Ovary superior: style short trifid. Fruit inflated, capsular, 3-valved. Gopalmagor.

Erioglossum, Blume.

Erect trees. Leaves odd-pinnate. Panicles terminal, erect. Flowers irregular, Sepals 5, unequal. Petals 4, unequal, obovate, clawed, with a hooded hairy scale on the inner face. Stamens 8, unilateral. Ovary stipitate, 3-lobed, 3-celled, style slender. The only species is *Erioglossum edule*, Blume.

Allophylus, Linn.

Small trees. Leaves 1-3-foliolate. Flowers in simple axillary racemes. Sepals 4. Petals 4,

with or without shaggy scales. Disc unilateral.
Stamens 8. Ovary 2-lobed and 2-celled.

Allophylus Cobbe, Blume.

Nephelium, Linn.

Trees. Leaves pinnate, alternate. Flowers in terminal and axillary panicles, regular. Calyx 4-8-lobed. Petals as many as calyx lobes, without scales. Stamens 5-10. Ovary pubescent, 2-3-lobed. Fruit tubercled or smooth. Aril copious, pulpy and fleshy.

Nephelium Litchi, Camb.—Petals 0. Fruit tubercled, 1-2-lobed. The Litchi.

Nephelium Longana, Camb.—Petals present. Fruit tubercled or smooth ultimately. The Longan (*Ashphal*).

N. O. 53. *Anacardiaceæ*.

Big spreading trees. Leaves simple or compound. Flowers small in much branched panicles. Calyx 3-5-partite, Petals 3-5. Disc flat, cup-shaped or annular. Stamens 1-5 on or inside the disc. Ovary superior, 1 or more-celled. Style excentric. Fruit a drupe.

Ovary 1-celled.

Stamen 1 (or 5).....*Mangifera*

- . Stamens 8-10 *Anacardium*.
 Ovary 2-5-celled. Styles free
 above *Spondias*.

Mangifera, Linn.

- . Stamens usually 1, others, if present, much smaller or imperfect. Style excentric. Leaves simple.

Mangifera indica, Linn. The mango.

Anacardium, Rottb.

Anacardium occidentale, Linn.—Leaves alternate, simple. Ovary obovoid or obcordate; ovule 1. Fruit a kidney-shaped nut on a fleshy stalk formed of the accrescent disc and top of the peduncle. *Hidgli-badam*. A similar case is found in *Semecarpus Anacardium*, Linn. f., in which the fruit is a fleshy drupe containing an acrid resin and is poisonous, but the accrescent torus is edible. This is *Bhela* or Washerman's ink.

Spondias, Linn.

Spondias Mangifera, Willd.—Deciduous trees. Leaves crowded at the tips of branches. Panicles

terminal, spreading. Drupe fleshy, stone 1-5-celled. The *Amra*.

N. O. 55. Moringaceæ.

Deciduous trees with soft wood. Leaves alternate, 1-2-3-pinnate; leaflets quite entire, caducous, glandular at the base. Panicles axillary. Flowers irregular. Calyx petaloid, segments unequal, 5. Petals 5, unequal, posterior or upper petal smaller, laterals ascending, anterior or lower larger. Stamens 5 alternating with 5 or 7 antherless filaments, inserted on the edge of the disc lining the calyx-tube. Ovary 1-celled, superior, stipitate; style slender; placentas 3, parietal. Fruit an elongated beaked capsule 3-6-angled.

Moringa pterygosperma, Gaertn.—A small tree. Leaves 1-2 ft., 3-pinnate, petiole slender, sheathing at the base. Glands on the leaves hairy. Panicles spreading. Flowers pedicelled, whitish honey-scented. Petals narrow, spatulate. Filaments of perfect stamens densely hairy at the base. Ovary hairy. Fruit pendulous, 9-ribbed. Seeds trigonous, winged at the angles. The *Sajinā*. The Horse-radish tree.

Séries.—Calycifloræ. Sepals united; petals free,
 inserted on the calyx; stamens $\frac{\text{peri}}{\text{epi}}$ gynous
 gynæcium $\frac{\text{apo}}{\text{syn}}$ carpous.

N.O. 57. *Leguminosæ.*

A worldwide order. Subdivided into three sub-orders by characters of the corolla, the common features being (i) odd petal posterior, (ii) pistil or gynæcium monocarpellary and (iii) fruit a legume varying in shape.

S. O. *Papilionaceæ.*

Herbs, shrubs or trees. Leaves, simple or compound, alternate. Flowers irregular. Corolla papilionaceous; petals 5, 4 lateral in two pairs (forming the wings or alæ and the keel or carina) and the 5th or odd petal posterior and is the largest and outermost in bud (=vexillum or standard). Stamens perigynous, 10, 9 united to form a narrow sheath fitting inside the keel and 1 free, lying in front of the slit of the sheath and opposite to the vexillum (hence this stamen is called the vexillary stamen); or, all the 10 stamens may be united forming a closed sheath.

Pistil of 1 carpel, sometimes stipitate. Fruit a legum^o, sometimes indehiscent (e.g., *Dalbergia Sissoo*, Roxb.) Ovules generally many ; 1 in *Lespedeza*, 2-3 in *Arachis hypogæa*.

Stamens monadelphous, keel petals firmly cohering ; keel beaked, pod turgid, dehiscent..... *Crotalaria*

Stamens 9+1, i.e., diadelphous.

Leaves digitately 3-foliolate. Pod dehiscent..... *Trifolium*

Leaves pinnately 3-foliolate.

Pod dehiscent, elongated..... *Trigonella*

Pod short, round or oblong..... *Melilotus*

Leaves imparipinnate, leaflets entire..... *Indigofera*

Leaves gland-dotted. Anthers obtuse. Leaflets 3 or 1.

Pod 1-seeded..... *Psoralea*

Pod many-seeded, soon dehiscent..... *Tephrosia*

Pod very long, distinctly septate..... *Sesbania*

Pod jointed. Leaves 3-foliolate, or 1-foliolate

Joints of pod turgid..... *Alysicarpus*

Joints of pod flat..... *Desmodium*

Leaves paripinnate, petiole ending
in a tendril or bristle.

Leaflets toothed..... *Cicer*

Leaflets entire.

Staminal sheath oblique

at apex..... *Vicia*

Staminal sheath truncate

at apex..... *Lathyrus*

Stamens monadelphous or diadelphous. Climbers.

Stamens monadelphous. Anthers

uniform..... *Glycine*

Stamens diadelphous. Anthers

not uniform. Keel largest..... *Mucuna*

Stamens monadelphous. Standard

largest..... *Erythrina*

Stamens diadelphous. Pod 1-seed-

ed. Flowers small..... *Spatholobus*

Stamens diadelphous. Pod 1-seed-

ed. Flowers large..... *Butea*

Stamens monadelphous. Pod

linear, flat..... *Pueraria*

Stamens diadelphous. Keel spiral *Phaseolus*

Stamens diadelphous. Style bearded *Clitoria*

„ „ Petals equal in
length..... *Dolichos*

Not climbers.

Stamens diadelphous. Leaves

gland-dotted..... *Cajanus*

„ „ Leaves digitate... *Flemingia*

Trees. Stamens 9 or 10 in two

bundles of 5 each..... *Dalbergia*

Crotalaria, Linn.

Herbs or shrubs of various habit. Leaves simple (1-foliolate) or digitately 3-foliolate. Standard with a short claw, usually round; wings shorter, equalling the keel petals. Ovary sessile or stipitate, multi-ovulate. Pod straight, turgid. A very big genus.

Crotalaria alata, Hamilt.—A suberect undershrub. Leaves subsessile. Stipule forming a wing from one node nearly to the next, its point lanceolate-deltoid.

Crotalaria sericea, Retz.—A robust undershrub; branches striated. Bracts persistent, reflexed. Corolla yellow, longer than calyx. Pod stalked, 1½-2 in. long.

Crotalaria striata, D.C.—An erect low shrub. Corolla longer than calyx, yellow striped with red. Pod cylindrical, rather recurved.

Trifolium, Linn.

Herbs. Leaves digitately 3-foliolate; stipules adnate to the petiole. Flowers in dense axillary

heads. Corolla adnate to the staminal sheath, standard and wings narrow. Pod minute. †

Trifolium repens, Linn.—A trailing plant. Leaflets obovate, emarginate, toothed. Flower heads globose, not dense; peduncles elongated, flowers deflexed.

Trigonella, Linn.

Annual herbs. Leaves pinnately tri-foliolate, leaflets toothed. Flowers in racemes. Stamens diadelphous, free from petals. Pod linear or linear-oblong, compressed or not, exserted.

Trigonella corniculata, Linn.—Diffuse, much branched suberect herb, 1 ft. high. Corolla 2-3 times longer than calyx. Pod narrow, linear, falcate.

Melilotus, Juss.

Annual or biennial herbs. Leaves as in *Trigonella*. Flowers in long racemes. Corolla caducous, free from the stamens; keel obtuse. Pod oblong, much exserted indehiscent.

Melilotus alba, Lamk.—A tall robust herb. Corolla white. Pod 2-seeded.

Indigofera, Linn.

Herbs or shrubs with hairs attached laterally, sometimes looking silvery white. Flowers in

axillary racemes. Keel straight, spurred near the base. ^p, Ovary sessile ; stigma penicillate. Pod linear-cylindrical, turgid.

Psoralea, Linn.

Herbs or undershrubs. Leaves simple or 3-foliolate, gland-dotted. All petals clawed ; keel obtuse. Stamens monadelphous or not. Ovary with a long filiform style. Pod ovoid or oblong.

Psoralea corylifolia, Linn.—Herbs. Leaves simple Racemes dense, short.

Tephrosia, Pers.

Herbs or undershrubs. Leaves odd-pinnate. Flowers in leaf-opposed racemes or solitary and axillary. Petals clawed ; keel not beaked. Stamens diadelphous. Ovary sessile, linear, many-ovuled. Style much incurved.

Tephrosia purpurea, Pers.—Racemes elongated. Pod slightly recurved. A copiously branched suberect perennial.

Sesbania, Pers.

Soft-wooded short-lived trees. Leaves long, narrow paripinnate. Calyx campanulate, shallowly

2-lipped. Corolla much exserted ; petals with long claws. Stamens diadelphous ; staminal sheath peculiarly shaped like the pelvic bone at the base. Ovary linear, long, stipitate, many-ovuled. Pod long, hanging, with distinct septa between the seeds.

Sesbania grandiflora, Pers.

Alysicarpus, Neck.

Diffuse annuals ; stem robust, ascending. Leaves trifoliolate. Flowers in elongated racemes. Pod not angled ; joints longer than broad. *Alysicarpus vaginalis*, D.C.

Desmodium, Desv.

Shrubs or herbs. Leaves 3-foliolate or simple. Flowers red, small, in dense racemes. Standard broad ; wings adhering to the obtuse keel. Stamens diadelphous or monadelphous, the tenth being partially united to the sheath formed by the other 9. Pod jointed, joints flat, about as long as broad. A big genus.

Desmodium gangeticum, D.C.—Stems suberect. Leaves 1-foliolate. Racemes copious, ascending, lateral and terminal. Pod falcate.

Desmodium parvifolium, D. C.—Stems trailing, profusely branched. Stipules as long as

petioles. Leaves 3-foliolate, small. Flowers in lax racemes. Joints of pod 3-4, as long as broad.

Desmodium gyrans, D. C.—An undershrub, 3-4 ft. high. Leaves 1-3-foliolate; side leaflets much smaller than the terminal one and move by jerks. Flowers in the inflorescence hidden by large ovate deciduous bracts. Pod 6-10-jointed, straight along the upper and indented along the lower suture. The Telegraph plant.

Cicer, Linn.

Annual herbs, much branched. Leaves imparipinnate with a terminal leaflet. Flowers solitary, axillary. Pod sessile, oblong, turgid, narrowed into the persistent style.

Cicer arietinum, Linn. The Gram.

Vicia, Linn.

Herbs. Leaves pinnate, ending in twisted tendrils or a short process. Stamens diadelphous; mouth of the sheath oblique.

Vicia Faba, Linn. Cultivated. The Bean.

Lathyrus, Linn.

Slender plants with wiry stems much branched, stem winged or not. Leaves equally pinnate

with a terminal tendril. Staminal sheath not oblique at the mouth.

Lathyrus Aphaca, Linn.—Petiole continued into a tendril, leaflets 0 ; stipules large, foliaceous, adpressed in pairs to the stem.

Glycine, Linn.

Twining or suberect herbs, stems stout, clothed with ferruginous hairs. Leaflets 3. Racemes few-flowered. Pods broad.

Glycine hispida, Maxm.=species 3. F. B. 1.

Mucuna, Adans.

Perennial twiners. Leaves large, 3-foliolate. Keel beaked. Stamens diadelphous. Ovary sessile, many-ovuled. Pod covered with brittle needle-like irritating bristles.

Erythrina, Linn.

Trees with prickly branches. Flowers large, coral-red, in dense racemes. Leaves large, appear after flowers. Standard considerably larger than wings and keel. Stamens monadelphous or diadelphous. Ovary stalked, many-ovuled. Pod linear, turgid, somewhat moniliform, i.e., with swelling at intervals.

Spatholobus, Hassk.

Woody climbers with 3-foliolate leaves. Nodes swollen. Flowers small in terminal panicles. Keel obtuse, nearly straight. Stamens diadelphous. Ovary 2-ovuled. Pod firm, ligulate, 1-seeded at the apex.

Spatholobus Roxburghii, Bth.

Butea, Roxb.

Erect trees or climbing shrubs with 3-foliolate large leaves. Flowers large, densely fascicled. Petals nearly equal in length ; keel much curved. Pod as in *Spatholobus*.

Pueraria, D. C.

Twining. Leaves 3-foliolate ; leaflets sometimes palmatifid. Standard spurred at the base, all petals equal in length. Stamens monadelphous. Ovary many-ovuled. Pod linear, flat.

Phaseolus, Linn.

Herbaceous twiners. Leaves 3-foliolate. Flowers in axillary racemes. Keel spiral. Style twisted round with the keel, bearded ; stigma very oblique.

Phaseolus radiatus, Linn. var. *Aurea*, Prain.—
The pulse *Sona-mung*. Seeds yellow. Leaves
pale green. Pods reflexed.

Clitoria, Linn.

Scandent undershrubs. Leaves 3-7-foliolate.
Flowers very showy. Standard spoon-shaped,
erect, very large ; wings and incurved keel much
shorter. Flowers solitary ; bracteoles large, 2,
roundish.

Clitoria Ternatea, Linn.

Dolichos, Linn.

Twining. Leaves 3-foliolate, large ; leaflets
as broad as long. Racemes long on equally long
peduncles. Style thickened upwards and bearded
around the stigma. Pod recurved, tipped with
the hooked persistent base of the style.

Dolichos Lablab, Linn. The *Sheem*.

Cajanus, D. C.

An erect shrub. Leaves 3-foliolate, leaflets
oblong-lanceolate. Keel truncate. Style long,
much upcurved. Pod linear, straight, narrowed
at both ends, torulose, i.e. somewhat moniliform.

Cajanus indicus, Spreng. The pulse *Arhar*.

Flemingia, Roxb.

Shrubs. Leaves simple or 3-foliolate, gland dotted below. Rachis of inflorescence zigzag ; flowers hidden by large folded persistent bracts arranged distichously.

Flemingia strobilifera, R. Br.

Dalbergia, Linn.

Trees or climbing shrubs. Leaves compound with alternate sub-coriaceous leaflets. Flowers small in terminal panicles. Standard broad ; keel obtuse. Stamens 9-10 in two bundles of 5 each. Ovary stalked, few-ovuled. Pod oblong or strap-shaped, thin and flat.

Dalbergia Sissoo, Roxb.. The timber tree Sissoo.

S. O. Cæsalpinieæ.

Herbs, shrubs or trees. Leaves pinnate compound, simple in the genus *Bauhinia*. Flowers irregular. Odd petal or standard smallest of all and innermost in bud. Stamens few, free, equal or unequal, or monadelphous or diadelphous.

Leaves bipinnate. Sepals imbricate

... *Cæsalpinia*

Leaves bipinnate. Sepals valvate.

Pod thin, flat *Poinciana*

Leaves bipinnate. Sepals valvate.

Pod moniliform *Parkinsonia*

Leaves once pinnate. Anthers

dehiscing by a terminal pore ... *Cassia*

Leaves once pinnate. Petals 0 ... *Saraca*

Leaves once pinnate. Stamens

monadelphous, only 3 developed *Tamarindus*

Leaves simple *Bauhinia*

Cæsalpinia, Linn.

Robust erect trees armed with prickles. Leaves large, bi-paripinnate. Flowers showy in axillary racemes. Calyx deeply cleft. Petals spreading, with a distinct claw and orbicular limb. Stamens 10, free, declinate. Ovary few-ovuled. Pod ligulate, flat.

Cæsalpinia pulcherrima, Swartz. = *Poinciana pulcherrima*, Linn.—A tree with scattered prickles on the branches. Petals round, crisped with a very distinct claw, reddish yellow. Stamens much exserted. The *Krishna-chura*.

Poinciana, Linn.

Erect trees, unarmed. Leaves as in *Cæsalpinia*. Flowers in corymbose racemes. Petals

clawed. Stamens as in *Cæsalpinia*. Ovary many-ovuled; style very long.

Poinciana Regia, Boj.—Filaments villous below. Petals much exceeding the calyx. The Gold-mohur tree. Introduced from Mauritius..

Parkinsonia, Linn.

Trees. Leaves with 2-6 pinnæ from a very short rachis; the pinnæ very long and leaflets minute. Flowers yellow in short racemes. Ovary short stalked, many-ovuled.

Parkinsonia aculeata, Linn.—Native of Tropical America, naturalised in India.

Cassia, Linn.

Shrubs or trees, or herbs. Leaves paripinnate. Flowers large in axillary racemes or terminal panicles. Stamens 10 or fewer or some reduced to staminodes, unequal. Ovary sessile or stalked, occasionally the stalk is branched and two carpels are developed on it. Pod very variable, dehiscent or indehiscent.

Cassia Fistula, Linn.—A middle-sized erect tree. Stamens all fertile, unequal. Pod very large 1-2 ft. long, cylindrical, with transverse septa between the seeds which are flattened parallel with the septa.

• *Cassia occidentalis*, Linn.—An undershrub. Perfect stamens 7, others reduced to staminal nodes with foliaceous sterile anthers. Pods compressed. Seeds flattened parallel with the valves with the fruit. Leaves with one large gland just above the base of the main petiole.

• *Cassia glauca*, Lamk.—A tall tree. Stamens 10, all perfect, sub-equal. Pod flat, strap-shaped, about 10 ft. long.

Saraca, Linn.

Erect trees. Leaves paripinnate ; leaflets rigidly coriaceous. Flowers in dense sessile corymbose axillary panicles ; bracteoles sub-petaloid, reddish. Calyx-tube long, cylindrical ; limb 4, reddish. Corolla 0. Stamens 3-8, exserted ; filaments long, filiform. Ovary long-stalked, many-ovuled. Pod flat.

Saraca indica, Linn. *Asoke*.

Tamarindus, Linn.

A spineless tree. Leaves paripinnate. Flowers racemed. Calyx-tube turbinate. Petals 3 and 2 are reduced to scales. Stamens monadelphous, only 3 are fertile, others reduced to bristles at the top of the staminal sheath. Ovary stalked. Pod

ligulate with a thin crustaceous epicarp and thick pulpy mesocarp.

Tamarindus indica, Linn. The Tamarind.

Bauhinia, Linn.

Unarmed erect trees or climbers with circinate tendrils. Leaves simple, deeply cleft at the apex into two lobes. Flowers large, showy in simple or corymbose racemes. Calyx-tube long and cylindrical or short and turbinate, limb spathaceous, entire, or toothed. Petals 5, clawed. Stamens 10 or fewer and then with staminodes, anthers versatile. Pod linear. A very big genus.

Bauhinia tomentosa, Linn.—An erect shrub with downy branches. Fertile stamens 10. Calyx with a very short tube and a spathaceous limb. Flowers in axillary pairs. Pod narrow, stalked.

S. O. Mimoseæ.

Herbs, shrubs or trees. Flowers regular; petals united, the 5th or odd petal posterior. Stamens definite or indefinite, free or united.

Stamens 10. Herbs with flowers in

round heads ... *Neptunia*

Tendrill-climbers with flower

in spikes ... *Entada*

Stamens 10, free. Trees. Pod not jointed	...	<i>Leucæna</i>
Pod jointed, ligulate	..	<i>Mimosa</i>
Stamens indefinite, free	...	<i>Acacia</i>
„ „ monadelphous. Pod thin, ligulate	...	<i>Albizzia</i>
„ „ monadelphous. Pod circinate	...	<i>Pithecolobium.</i>

Neptunia, Lour.

Unarmed herbs. Leaves bipinnate ; leaflets numerous, small, strap-shaped, sensitive. Flowers minute. Anthers with gland at the tip. Ovary stalked, stigma club-shaped. A marsh-genus.

Entada, Adans.

Woody unarmed tendril-climbers. Leaves bipinnate. Stamens 10, free. Pod flat, woody, very large, with many joints. Seeds large, compressed, orbicular, funicled, chocolate-coloured.

Entada scandens, Benth. *Geela*.

Leucæna, Benth.

Leaves bipinnate. Flowers sessile in dense globose heads. Petals free ; stamens 10, free ; anthers without gland.

Leucæna glauca, Bth.—A low erect tree.

Mimosa, Linn.

Shrubs or herbs. Leaves bipinnate ; leaflets sensitive. Flowers minute in dense globose heads. Petals united below.

Mimosa pudica, Linn.—Shrubs. Stem and leaf-rachis copiously bristly and prickly. Leaves digitately bipinnate; leaflets small, 24-40. Flowers in small peduncled heads.

Mimosa rubicaulis, Lamk.—A low tree with slender grooved branches, covered with copious small scattered hooked spines, not bristly. Leaflets 12-24.

Acacia, Willd.

Spinose or prickly shrubs or trees. Leaves bipinnate ; leaflets minute. Flowers in globose heads or cylindrical spikes. Stamens free, indefinite, much exserted. A big genus, mostly Australian.

Albizzia, Durazz.

Large trees. Leaves bipinnate. Flowers in globose heads. Stamens united, indefinite. Pod straight, strap-shaped, large.

Pithecolobium, Mart.

Erect trees. Pod strap-shaped, circinate or falcate, not straight.

Pithecolobium dulce, Benth.—Pinnæ and leaflets each unijugate, leaflets coriaceous, oblique. Seeds with a white edible aril.

N. O. 58. *Rosaceæ*.

Herbs, shrubs or trees. Leaves simple or compound ; stipulate. Flowers usually regular. Calyx-tube lined with the disk. Petals 5; the odd or the 5th petal anterior, four lateral. Stamens indefinite, perigynous. Pistil monocarpellary or apocarpous ; carpels many ; or syncarpous, then ovary superior or inferior (*Pyrus*, a North Temperate genus ; *Cotoneaster*, another Temperate genus). Chiefly a temperate order.

Carpel 1 ; calyx 5-10-toothed. Fruit

a drupe *Pygeum*

Carpels many, free. Stamens indefinite. Fruit of many dry or fleshy ripe carpels not included in the calyx-tube. Shrubs with compound leaves... ..

Rubus

Carpels many, free. Calyx bracteolate.

Stamens many *Fragaria*

Stamens few (4) *Potentilla*

Carpels many, free calyx-tube urceolate.

Stamens many. Ripe carpels
(achenes) included in the calyx-
tube

Rosa

N. O. 61. *Droseraceæ*.

An insectivorous order. Herbs. Leaves radical or cauline. Lamina covered with sensitive glandular hairs which curl over and entrap insects when touched by them, or in some, the lamina closes automatically. Sepals, petals and stamens isomerous, 4-5. Ovary superior, globose 1-3-celled, styles 5-3. Capsule membranous, many-seeded.

Cauline leaves alternate. Leaves
glandular ...

Drosera

Cauline leaves whorled, or leaves
radical, vesicular ...

Aldrovanda

Drosera peltata, Sm. of the Khasi Hills stains paper pink.

Drosera Burmanni, Vahl.—Plenty in grass lawns at Rangpur.

Aldrovanda is rootless, with whorls of spatulate-orbicular leaves at the nodes of the articulate stem.

N. O. 65. *Rhizophoreæ*.

Mangrove-forming plants. Trees or shrubs. Leaves opposite, simple coriaceous, not hairy; stipules interpetiolar, very caducous. Flowers in axillary cymes. Calyx-limb produced beyond the ovary, 4-14-lobed. Petals as many as calyx-lobes, entire or slightly 2-lobed at the apex or lacerate. Stamens twice the number of petals and embraced by the petals in pairs. Ovary inferior, 5-celled to 1-celled. Seeds viviparous, *i. e.* they germinate and the radicle elongates out while the fruit is still on the tree.

Petals 4, entire. Stamens 8. Ovary

2 celled ... *Rhizophora*

Petals 5-6, slightly notched at apex. Stamens 10-12. Ovary

3-celled ... *Ceriops*

Petals 8-14, 2-fid. Stamens 16-28.

Ovary 2-4-celled ... *Bruguiera*

N. O. 66. *Combretaceæ*.

Trees or shrubs, some are climbers. Leaves alternate, simple (compound, 3-foliolate in *Illigera* only). Calyx-tube adnate to the ovary and produced above it (sometimes to a great length). Petals 4-5 or 0. Stamens 4-5 or 8-10, on the

72 COMMON NATURAL ORDERS OF BENGAL

calyx-limb. Ovary inferior, 1-celled ; style simple. Ovule pendulous from the upper corner of the cell. Fruit coriaceous or drupaceous, very often winged.

Petals 0. Flowers in racemes or

spikes. Calyx-limb deciduous... *Terminalia*

Petals present. Calyx-tube above

the ovary less than $\frac{1}{2}$ in. long... *Combretum*

Petals present. Calyx-tube above

the ovary more than $\frac{1}{2}$ in. long... *Quisqualis*

Flowers in heads. Petals 0 ... *Anogeissus*

Terminalia, Linn.

Large trees. Leaves with glands on the petiole or near the base of the midrib beneath. Flowers small. Mouth of calyx-tube campanulate. Petals 0. Stamens 10 on the calyx-tube. Disk epigynous, hairy. Ovary 1-celled, inferior, style long.

Terminalia Belerica, Roxb.—Fruit not winged. Petioles of leaves very long, lamina broadly elliptic, base cuneate. Fruit tomentose, globular. The *Baerā* used in Kaviraji medicines.

Terminalia Chebula, Retz.—Fruit not winged. Leaves not clustered towards the end of twigs, acute at apex, rounded at base. Fruit ellipsoid. The *Haritaki*.

Terminalia Arjuna, Bedd.—Fruit with 5 acute wings. Leaves opposite, short-petioled, oblong or elliptic. Bark pale, flaky. The Arjun tree. Extract from bark is a substitute for *Digitalis* in heart troubles.

Terminalia Catappa, Linn.—Fruit not winged. Leaves clustered towards the ends of twigs ; petioles very short, leaf-base cordate, lamina obovate. The *Deshi Badam*.

Combretum, Linn.

Large shrubs with long pendent branches. Flowers in paniced spikes. Calyx-tube constricted above the ovary, and then produced. Petals as many as calyx-lobes, on the calyx-limb. Stamens twice as many as petals. Ovary inferior, 1-celled. Fruit with 4-5 wings, angles or ridges. Seed 1.

Quisqualis, Linn.

Large scandent shrubs. Flowers in axillary or terminal spikes, red or white. Sepals 5. Calyx-tube long, slender, produced far beyond the ovary. Petals 5, small. Stamens, 10, short. Carpel 1, ovary inferior ; style adnate to the calyx-tube.

N. O. 67. *Myrtaceæ*.

Trees. Leaves simple, entire, opposite, coriaceous, gland-dotted. Petals isomerous with calyx-lobes and inserted on the disc lining the calyx. Stamens infinite ; filaments free or united at the base in bundles. Ovary inferior. Fruit crowned with the persistent calyx-limb.

Fruit capsular. Ovary 2-5-celled.

Flowers in heads or spikes ... *Melaleuca*

Fruit not capsular. Calyx-limb

deeply divided in flower ... *Psidium*

Ovary 2-3-celled without spurious

partitions *Eugenia*

N. O. 68. *Melastomaceæ*.

Small shrubs. Leaves multicostate. Flowers large, solitary, or in racemes. Stamens few, all alike (*Osbeckia*) or very unequal (*Melastoma*) ; anthers attenuated or beaked opening by pores ; filaments bent. Ovary inferior. Common in Darjeeling, Himalayan regions, Kurseong and above.

N. O. 69. *Lythraceæ*.

Trees, shrubs or herbs, branches 4-angled. Leaves simple, entire, opposite. Calyx-tube

persistent, lobes 3-6. Petals as many as calyx-teeth. Stamens few or many on the calyx-tube. Ovary superior, in the bottom of the calyx-tube. Fruit coriaceous (leathery) or membranous. Seeds various in shape.

Aquatic marsh herbs with
minute flowers. Stamens
few ... *Ammannia*

Terrestrial with showy
flowers. Stamens many
Seeds with a large wing *Lagerstræmia*

Lagerstræmia Flos Regimæ, Retz. is the
Jarool, a timber-tree.

N. O. 70. *Onagraceæ*.

Terrestrial, swampy or aquatic herbs. Calyx-tube adnate to the ovary and produced beyond it into a 2-5-lobed limb. Stamens as many or twice as many as petals. Ovary inferior.

Trapa bispinosa, Roxb.—A floating aquatic. Sepals, petals and stamens, 4. Calyx-limb 4-partite; all the lobes of the limb or 2 of them becoming spinescent in the fruit. Ovary half-inferior. Fruit an obovoid bony nut with 4 prominent angles. Seed large, solitary, edible. The *Pani-phal*.

N. O. 74. *Passifloreæ*.

Twining herbs with tendril. Flowers 3-bracteolate. Corolla with a single or double corona. Gynandrophore prominent. Sepals, petals and stamens, 5. Ovary superior, 1-celled. Placenta parietal.

N. O. 75. *Cucurbitaceæ*.

Climbing herbs by tendrils. Flowers 1-sexual. Male flowers—anthers are sinuous, all the connectives being united into a solid pillar around which the anthers are placed, and thus the anthers are more or less syngenesious (*Cucurbita*). In some cases the anthers are free (*Luffa*, *Cucumis*, *Citrullus*). Ovary inferior, 1-celled. Placenta parietal.

Leaves not compound. Female

Flowers solitary.

Anthers sinuous, connate.

Petals almost free, 5.

Petals fimbriate. Calyx-tube

less than 3 in. ... *Trichosanthes*

Petals entire. Tendrils divid-

ed. Petiole with 2 glands.

Fruit very large ... *Lagenaria*

•
Anthers free.

Male flowers in racemes ... *Luffa*

Male flowers solitary. Fruit

very large-fleshy ... *Benincasa*

Male flowers solitary or clus-

tered. Tendrils simple ... *Cucumis*

Male flowers solitary.

Tendrils 2-3-fid ... *Citrullus*

Anthers connate.

Petals united half-way up.

Tendrils simple. Flowers

white ... *Cephalandra*

Tendrils divided. Flowers

yellow ... *Cucurbita*

Trichosanthes, Linn.

Herbaceous tendril climbers; tendrils 2-5-fid. Leaves palmately lobed or angled. Flowers diœcious; petals fimbriate. Female flowers solitary; ovary inferior, 1-celled, 3-carpellary. Male flowers in axillary peduncled pairs, one peduncle bearing flowers in a raceme, the other bearing a solitary flower. Stamens 3.

Trichosanthes dioica, Roxb.—Leaves cordate-oblong, acute, sinuate-dentate, harsh. Anthers free. Both male peduncles 1-flowered. The *Patol*. The leaves and twigs are known as *Paltā*.

Trichosanthes palmata, Roxb.—Leaves palmately cut, dentate-serrate. One male peduncle 1-flowered (or absent), the other racemed. Fruit globose, bright red with ten orange streaks. The *Mākāl*.

Trichosanthes cordata, Roxb.—Leaves cordate-ovate, acute, almost entire, hairy beneath. The *Bhui-kumra*.

Luffa, Cav.

Large climbers. Leaves cordate, 5-angled. Tendril 2-5-fid. Flowers monœcious ; males in racemes, females solitary. Sepals and petals 5. Stamens 3 or 5 ; anthers free ; filaments free or united. Fruit fibrous, oblong, smooth or angled or a spinous berry.

Luffa ægyptiaca, Mill.—Stamens 5. Fruit elongate, clavate, smooth, 10-ribbed. A very large climber. The *Dhundul*.

Luffa acutangula, Roxb.—Stamens 3. Fruit elongate, 10-angled. The *Jhinga*.

Cucumis, Linn.

Hispid herbs. Tendrils simple. Leaves palmately lobed or angled. Flowers yellow ;

monoëcious, males clustered on axillary peduncles, females solitary, peduncled. Stamens 3, anthers free, connective produced forming a crest.*

Cucumis sativus, Linn.—Annual climbing herb. Leaves 5-angular, hairy but not scabrid. Fruit cylindric. The *Sasa*.

Cucumis Melo, Linn.—An annual climber. Leaves orbicular-reniform, shortly 5-angular or lobed, scabrid and softly hairy on both surfaces. Fruit spherical ovoid. *Karbuz*. The Melon.

Citrullus, Schrader.

Hispid climbing herbs. Leaves deeply palmately lobed, the lobes narrow sinuate-pinnatifid. Flowers monoëcious, males and females solitary, large. Stamens 3, anthers almost free, connective not produced. Fruit large, globose or ellipsoid.

Citrullus vulgaris, Schrad.—The Water Melon. *Tarbuz*.

Cucurbita, Linn.

Large climbing herbs, hispid or hairy tendrils, 2-4-fid. Leaves cordate-ovate, 5-angular or lobed. Flowers yellow, very large, monoëcious, males and females solitary. Calyx-limb

of 5 linear or foliaceous lobes. Corolla campanulate, 5-lobed. Stamens 3, inserted low in the calyx-tube ; anthers united.

Cucurbita Pepo, D.C.—An annual climber or creeper. Leaves deeply lobed with broad sinuses between the lobes. The Pumpkin.

Cucurbita maxima, Duchesne.—Leaves not deeply lobed, sinuses between the lobes narrow. The ordinary *Kumra*, Gourd.

Lagenaria, Ser.

Large climbing herbs. Leaves ovate or orbicular-cordate, dentate. Tendrils 2-fid. Flower large, white, solitary ; stamens 3 ; anthers connate. Style short with 3 bifid lobes. Fruit large, bottle-shaped (broader upwards), ultimately becoming almost woody.

Lagenaria vulgaris, Seringe.—*Lou* or *Kodu*. A kitchen vegetable.

Benincasa, Savi.

A large softly hairy climber. Leaves cordate, reniform, orbicular about 5-lobed. Flowers large, yellow. Petals 5, slightly united at the base.

Stamens 3, anthers free. Fruit cylindric, long, fleshy, ultimately covered with a waxy bloom.

Benincasa cerifera, Savi. The *Chal Koomra*.

Cephalandra, Schrad.

Cephalandra indica, Naud.—Fruit a smooth, fleshy, cylindric berry, bright scarlet. *Telakucha*.

N. O. 80. *Umbelliferae*.

Herbs. Leaves compound or decomposed ; simple in the genus *Bupleurum*. Flowers in compound umbels ; umbels simple in the genera *Hydrocotyle* and *Bupleurum* ; umbels involucrate. Calyx-tube adnate to the ovary, limb 0, or inconspicuous. Petals 5, epigynous, unequal, with the apex notched or 2-lobed and inflexed. Stamens 5, epigynous. Ovary inferior, 2-celled, disc 2-lobed. Ovules 1 in each cell of ovary, pendulous. Fruit of 2-indehiscent compressed ripe carpels pendulous from the two arms of a forked axis called the carpophore. The mericarps have 5 primary ridges and 4 secondary ones intercalated between these ; pericarp traversed by oil canals or vittæ, on the number and relative position of which the order is subdivided into its genera. A very difficult order.

Sub-Class—Gamopetalesæ (Corollifloræ). Sepals united. Petals united. Corolla on the Thalamus. Stamens epipetalous.

Series—Inferæ or Epigynæ. Ovary inferior.

N. O. 84. *Rubiaceæ*.

Herbs, shrubs or trees. Leaves opposite with interpetiolar stipules, or whorled (Rubia). Stamens 4-5, inserted on the mouth or in the tube of the corolla. Ovary inferior, 2-10-celled ; style simple or divided. Fruit a berry drupe or capsule.

Flowers collected into dense
globose heads ... *Anthocephalus*
Herbs. Fruit capsular, seeds
angular ... *Hedyotis*
One lobe of calyx forming a
coloured leaf ... *Mussaenda*
Corolla lobes twisted in bud.
Ovary 1-celled ; stigma fusi-
form ... *Gardenia*
Corolla lobes 4, twisted in bud.
Ovary 2-4-celled. ... *Ixora*
Corolla lobes valvate in bud.
Style-arms 2-5 papillose all
over ; twining shrubs ... *Paederia*

Corolla lobes valvate in bud.

Style undivided. Fruit of 2

indehiscent cocci *Hydrophyllax*

Herbs. Leaves whorled ... *Rubia*

N. O. 88. *Compositæ*.

Herbs or small shrubs, some aromatic, *e.g.* Eupatorium, Artemisia, etc. Some species of Dahlia become arborescent. Some have milky latex, *e.g.* *Lactuca gracilis*. Inflorescence a capitulum, which may be 1-flowered, *i.e.* a single flower with a calyx like involucre, *e.g.* Cæsalia in rice-fields, Echinops and Lagascea ; or 2-5-flowered as in Elephantopus in which the seed germinates in the head, which is some form of vivipary. Leaves simple, or compound, or pinnatisected as in Artemisia. The leaves of *Spilanthes acmella*, L. are eaten. Calyx superior, tube united with the ovary, limb obsolete, or represented by short papery scales or a ring of hairs around the shoulders of the ovary, known as pappus. Corolla all tubular, or that of the ray florets ligulate and of the disc florets tubular. Stamens 5, epipetalous, anthers syngenesious. Ovary inferior, 1-celled. Style 2-armed. Ovule anatropous, of axial origin, *i.e.*, it is developed on the thalamus or axis of

the flower ; it has only one integument. (Other instances of axial ovule are Primulaceæ, Plumbaginæ, Plantaginæ, Polygonaceæ and Gnetaceæ.) Fruit an achene. This order is allied to Dipsaceæ, Valerianæ and Lobeliaceæ as regards Syngenesious anthers and much reduced calyx-limb and general nature of inflorescence. A world-wide order.

All florets tubular, never yellow.

Anthers cleft at base. Style arms subulate, hairy.

Heads distinct ; many-flowered.

Achenes 10-ribbed. Pappus

long, copious ... *Vernonia*

Heads 2-5-flowered, crowded

into dense masses like single

heads ... *Elephantopus*

All florets tubular, never yellow.

Anthers not cleft at base.

Style arms obtuse, papillose.

Anther tip appendiculate.

Pappus of slender hairs.

Involucre of many bracts... *Eupatorium*

Anther tip appendiculate.

Pappus of slender hairs.

Invol. bracts 4 ... *Mikania*

Anther tip appendiculate. Pappus

paleaceous ... *Ageratum*

All florets tubular, or the outer
ligulate. Anther cells (except
Laggera) tailed. Style-arms
linear, obtuse. Florets yellow.

Heads not in globose masses ... *Blumea*

Heads in dense globose or ovoid
masses. Pappus 0 ... *Sphæranthus*

Heads corymbose ; unisexual.

Style undivided ... *Anaphalis*

Style divided ... *Gnaphalium*

Heads 1-flowered in a leafy
involucre ... *Cæsulia*

Receptacle paleaceous. Anther cells
not tailed. Style-arms truncate
or appendiculate, or of sterile
flowers, entire.

Heads 1-flowered in globose
clusters. Leaves opposite ... *Lagascea*

Heads unisexual. Invol. bracts
of female heads united into
an ovoid 2-beaked utricle
containing 2 flowers and
clothed with hooked bristles
on the outside ... *Xanthium*

86 COMMON NATURAL ORDERS OF BENGAL

Paleæ of the receptacle flat,
 „ narrow. Outer invol. bracts
 many. Leaves opposite ... *Eclipta*

Paleæ of the receptacle concave.
 Ray florets, white or yellow.
 Achenes ciliate. Leaves op-
 posite *Spilanthes*

Style arms appendaged. Leaves
 opposite. Achenes 2-4-awned... *Bidens*

Pappus paleaceous. Heads very
 long-peduncled. Leaves pin-
 natisect or not *Tridax*

Heads small, disciform, racemose or
 paniced. Anther cells not tailed.

Receptacle naked. Leaves aro-
 matic, entire, or pinnati-
 sected *Artemisia*

Heads yellow ; involucral bracts
 l-seriate. Anthers not tailed.
 Pappus of fine hairs.

Leaves radical or alternate ... *Senecio*

Involucral bracts many-seriate.
 Anthers tailed. Pappus various.

Pappus feathery. Heads sub-
 racemose... .. *Ainslaea*

*Scapigerous herbs. Ray flowers
 2-lipped *Gerhæra*

Herbs with milky juice. Leaves
 radical or alternate. Corolla all
 ligulate. Anther bases sagittate.

Involucre narrow. Achenes com-
 pressed, beaked ... *Lactuca*

Series—Superæ. Ovary superior, except Vac-
 ciniacæ and Maesa of Myrsinææ.

*Carpels more than 2.

N. O. 92. Vacciniacæ.

Epiphytic shrubs with stems greatly thickened
 at the base. Corolla tubular, stamens 10, epigy-
 nous, free; filaments short; anthers produced
 upwards into 2 long beaks opening by apical
 pores, often spurred behind. Ovary inferior, 5-
 celled; style cylindric.

Corolla long, tubular, red, with
 transverse marks ... *Agapetes*

Corolla small, campanulate or
 ovoid *Vaccinium*

N. O. 93. *Ericaceæ*.

Shrubs or trees. Corolla hypogynous, urceolate. Stamens 10, 5, 8, or 20 ; hypogynous or slightly attached to the corolla at its base ; anther cells dorsally spurred, or produced into tubes. Fruit capsular.

Capsule	septicidal.	Anthers
	opening by	terminal
pores <i>Rhododendron</i>

N. O. 100. *Myrsinæ*.

Shrubs or small trees. Leaves gland-dotted. Calyx 2-bracteolate in *Maesa*. Corolla tube short or 0. Stamens 3-7, opposite corolla lobes ; anthers free or united. Ovary superior ; semi-inferior in *Maesa*.

Filaments long ; anthers septate ;
mangrove genus ; fruit
cylindric, curved, acute,
1-seeded ; seed germinating
inside the fruit ... <i>Ægiceras</i>

Calyx superior ; 2-bracteolate ... *Maesa*

Series—Bicarpellatæ. Carpels 2, united.

N. O. 104. Oleaceæ.

Scandent or erect shrubs. Leaves opposite; simple, 3-foliolate or pinnate. Flowers in terminal or axillary trichotomous cymes. Calyx small, teeth long or short. Corolla gamopetalous with a long or short tube; limb 4-6-lobed. Petals rarely free or 0. Stamens 2, on corolla tube, or hypogynous if petals free or 0. Ovary superior; 2-carpellary, 2-celled. Fruit a loculicidal capsule or a drupè or baccate.

Scandent shrub. Fruit baccate.

Calyxlobes narrow, long or short. Corolla lobes 4-10, spreading. Leaves simple or compound

... *Jasminum*

Erect tree, much branched.

Fruit capsular, compressed.

Leaves simple ... *Nyctanthes*

N. O. 106. Apocynaceæ.

Erect or twining shrubs with watery or milky latex; some are woody climbers (*e.g.*, *Ecdysanthera*, a rubber-producing plant of Assam).

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Stamens 5 ; near corolla-throat ; anthers sagittate, more or less conniving ; filaments short ; connective often produced into an appendage. Pistil bicarpellary ; ovaries free (except *Carissa*, *Thevetia*) ; styles usually free at the base, united above and thickened at the top into a somewhat dumb-bell-shaped structure ; stigma acute or obtuse, 2-fid. Fruit of two follicles or a drupe if ovaries are united. Seeds various, often comose.

Anthers included, Carpels 2,
wholly combined. Ovary 2-
celled. Erect or stout climbing
armed shrubs ... *Carissa*

Ovaries free. Fruit of 2 drupes.
Leaves whorled. Disc present *Rauwolfia*

Calyx glandular within. Carpels,
2-ovuled ; Ovaries free. Fruit
of 2 woody and fibrous ellip-
soid drupes, stamens included.
Disc 0. Flowers large, white ... *Cerbera*

Calyx glandular within. Carpels
6- ∞ -ovuled. Fruit of 2 folli-
cles. Disc of 2 scales. Corolla
salver-shaped, pink ... *Vinca*

• Calyx glandular within. A small tree with thick crooked trunk and rough bark. Branches leafy at the tip. Stamens near the base of the corolla tube. Corolla salver-shaped (when old), fragrant, pink or yellowish. Disc 0. Follicles about 5 in. long, ellipsoid or linear, cylindric, strongly divergent, very stout ; seeds many in each cell and embedded along the much thickened and solid placenta almost filling the cell *Plumeria*

Erect trees. Calyx glandular within. Leaves whorled. Seeds
Comose *Alstonia*

Erect trees. Calyx glandular within. Leaves opposite. Seeds comose. Style short ... *Holarrhena*.

• Corolla throat broad, with 5 scales. Anthers included. Leaves whorled. Wood with bordered pits. *Nerium*

Flowers large, yellow. Corolla
 funnel-shaped ; tube cylindric
 with scales at the throat hiding
 anthers. Carpels wholly com-
 bined. Fruit a drupe ... *Thevetia*

N. O. 107. *Asclepiadeæ*.

Herbs or shrubs, often twining, with milky latex. Flowers gynandrous, *i.e.*, androecium and gynoecium united by their tips, *i.e.*, by anthers and stigma, with single (staminal) or double (corolline and staminal) corona of scales. Filaments of stamens united into a tube attached to the base of the corolla-tube. Pollen agglutinated into pollinia covered with a thin membrane and united in pairs to a corpusculum, two pollinia of adjacent anther-lobes of two anthers form a pair. Anthers often syngenesious. Pistil and fruit as in Apocynaceæ. Styles always free at the base ; stigma 5-angular. Seeds comose in some.

Corona single, staminal.

Processes laterally compressed ... *Calotropis*

Processes spoon-shaped ... *Asclepias*

Twiners. Corolla funnel-shaped.

Corona staminal ; processes

laterally compressed ... *Dæmia*

- Twiners. Pollinia erect in pairs
 on the corpuscle. Corolla
 rotate. Staminal tube minute.
 Coronal processes fleshy ... *Tylophora*
- Twiners with thick and fleshy
 leaves. Corolla rotate. Corona
 very large, stellate ... *Hoya*

N. O. 109. *Gentianaceæ*.

Herbs, terrestrial or aquatic. Stamens as many as corolla-lobes, on the corolla-tube. Disc of 5 glands. Ovary superior 1-celled ; style short, simple , ovules many. Fruit capsular.

- Corolla with 1 or 2 shallow
 depressions, near the base of
 each of its lobes ... *Swertia*
- Floating aquatic herbs with
 cordate leaves ... *Limnanthemum*

N. O. 112. *Boragineæ*.

Herbs (*e.g.*, *Heliotropium*), shrubs or trees (*e. g.*, *Cordia*), often hispid in all parts. Stem round. Flowers irregular in helicoid cymes. Stamens as many as corolla lobes. Pistil of 2 united carpels. Ovary more or less 4-lobed. Style

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terminal (e.g., *Cordia*, *Heliotropium*, etc.) or gynobasic (e.g., *Cynoglossum*, etc.). Fruit a small drupe or a schizocarp of 4 nutlets. The popular " Forget-me-not " is *Myosotis scorpioides*.

N. O. 113. *Convolvulaceæ*.

Twining herbs or shrubs. Flowers regular. Corolla plicate in bud, campanulate or funnel-shaped. Stamens 5. Ovary superior, 2-celled, ovules 2 in each cell. Style terminal. Fruit capsular.

Fruit indehiscent. Stigma large,
globose ... *Erycibe*

Fruit capsular.

Stigmas 2, globose. Filaments
dilated near the base.

(*Ipomœa aquatica*, Forsk. is
an aquatic species with stems
trailing on mud and floating
to a great length. Edible.

Ipomœa biloba, Forsk. is a
xerophytic sand-binding species
found on the sand-dunes

at Chittagong coast) ... *Ipomœa*

Stigmas 2, linear, styles 2 ... *Evolvulus*

Leafless yellow twining parasite ... *Cuscuta*

N. O. 114. *Solanaceæ*.

Herbs or shrubs. Some are deadly poisonous (e.g., the Henbane=*Hyoscyamus niger* ; Belladonna=*Atropa belladonna*, etc.) Leaves alternate never opposite ; simple or in some compound. Corolla infundibuliform or wide campanulate. Carpels 2, united, not antero-posterior ; ovary superior, 2-celled ; ovules many in each cell. Fruit baccate or a septifragal capsule.

Anthers opening by 2-pores at the
apex. Leaves entire or pin-
natifid. Calyx accrescent in
fruit ... *Solanum*

Anthers dehiscing longitudinally.
Calyx not accrescent. Flowers
small ... *Capsicum*

Calyx in fruit much enlarged, then
ventricose and concealing the
much smaller palatable berry... *Physalis*

Flowers large, solitary. Fruit
septifragal capsule ... *Datura*

Flowers in terminal panicles.
Fruit capsular. Viscid herbs
readily wilting after being
uprooted ... *Nicotiana*

N. O. 115. *Scrophulariaceæ*.

Herbs or shrubs. Flowers irregular. Corolla personate, or limb obliquely 4-5-lobed. Stamens 4 ; 2 long, 2 short (*i.e.* didynamous) ; or 2 ; anthers sometimes stipitate (*Lindenbergia*). Carpels 2, united, antero-posterior ; ovary superior, 2-celled ; ovules many in each cell. Fruit capsular.

A species of *Euphrasia* is used medicinally in measles. Water distilled from *Euphrasia officinalis* is used in ophthalmia. *Scoparia dulcis* is the source of American febrifuge. This species has free central placenta in the fruiting stage.

Corolla tubular, spurred, capsule opening by pores ... *Linaria*

Corolla not saccate or spurred.

Fruit capsular.

Flowers in sub-second
racemes ... *Mazus*

Corolla as above. Anther-cells
separate. Calyx campanulate, 5-fid ... *Lindenbergia*

Corolla as above. Calyx segments 5 ; stamens 4 ... *Vandellia*

Corolla as above. Stamens 2.
Capsule long ... *Bonnaya*

- Anther-cells confluent at the tip, sagittate.
 Creeping herbs. Leaves*
 dimorphic ... *Hemiphragma*
- Corolla 4-fid, Clayx-4-5-partite.
 Erect herb ... *Scoparia*
- Anthers mucronate. Calyx
 tubular. Corolla-tube
 straight or curved ... *Striga*

N. O. 122. *Acanthaceæ*.

Herbs or shrubs. Inflorescence racemose with prominent bracts and bracteoles. Flowers irregular. Calyx 5-partite. Corolla 2-lipped or sub-equally 5-lobed. Stamens 4 or 2; connective prominent; anther-lobes distant and at different levels in some. Pistil of 2 united beaked carpels; beak generally empty; style bifid at apex into 2 very unequal arms. Fruit loculicidal capsule; seeds few on hard hooked structures known as Retinacula.

- Scandent or twining. Calyx
 minute, 10-16-toothed.
 Bracteoles 2, spathaceous, very
 large. Corolla large, tube
 curved, limb • oblique.
 Leaves often cordate ... *Thunbergia*

Seeds on retinacula. Sepals 5,
or if 4, one larger. Anthers
parallel. Style 2-fid, one lobe
suppressed.

Corolla 2-lipped. Leaves toothed
or pinnatifid. Flowers
axillary, sessile ... *Cardanthera*

Leaves entire. Retinacula hooked.
Corolla 2-lipped.

Flowers axillary, sessile ... *Hygrophila*

Corolla not 2-lipped. Bracteoles
large ... *Ruellia*

Flowers capitate. Bracteoles small
Corolla not 2-lipped ... *Hemigraphis*

Ovules 2 in each cell. Corolla-tube
very long, linear. Sta-
mens 2 ... *Dædala-*
canthus

Corolla small. Stamens 4,
Bracteoles 0. Ovules 2 in
each cell ... *Phaylopsis*

Corolla-tube short ; upper lip
obsolete, lower 3-lobed ... *Acanthus*

Seeds on curved hardened retinacula.

Anther cells often spurred at the base, one often placed much above the other. Style 2-fid, both the lobes equal ; or sub-entire.

Capsule compressed. Flowers panicled seeds not compressed.

[Leaves of *A. paniculata* used as a tonic medicine for infants (*Kalmegh*)]

... *Andro-
gaphis*

Capsule not compressed.

Seeds compressed.

Corolla cylindric, curved ... *Phloga-
canthus*

Corolla lobes 5, subequal.

Stamens 2; anthers parallel.

Ovules 2 in each cell ... *Eranthe-
mum*

Corolla distinctly 2-lipped.

Stamens 2. Bracts in 1-sided spikes ... *Rungia*

Corolla 2-lipped. Stamens 2;

anther-cells placed one much higher than the other ... *Justicia*

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- Corolla 2-lipped. Stamens 2 ;
anther-cells placed one
much higher than the
other, not spurred at the
base [*A. vasica* Nees is a
medicinal plant (*Bakas*)].... *Adhatoda*
- Corolla 2-lipped, tube narrow,
long. Bracts large.
Anther cells parallel ... *Ecbohium*

N. O. 125. *Verbenaceæ*.

Often aromatic herbs or shrubs, or trees.
Herbs, *e.g.*, *Lippia*, *Lantana*, etc. Trees, *e.g.*,
Tectona, the Teak (*Tectona grandis*). Leaves
simple or digitately compound (pinnately com-
pound, in *Peronema* only). Calyx shortly lobed,
persistent and surrounds the fruit. Corolla irregu-
lar ; sometimes 2-lipped (*e.g.*, *Vitex*). Stamens 4,
didynamous. Carpels 2, connate in a superior
2-celled (or 4-celled) ovary ; ovules 1 or 2 in
each cell. Style terminal. Fruit a drupe.

Shrubs with spicate inflorescence.

Fruit a drupe ... *Lantana*

Small shrubs. Fruit capsular.

Flowers in spikes ... *Lippia*

Herbs. Calyx cylindric, 5-
ribbed. Stamens 4. In-
florescence spicate ... *Stachytarpheta*

Inflorescence cymose. Flowers
4-merous regular.

Drupe with 4 pyrenes ... *Callicarpa*

Drupe included in the
accrescent calyx ... *Tectona*

Corolla 2-lipped. Leaves
digitately 3-5-foliolate *Vitex*

Corolla 2-lipped. Calyx
campanulate. Leaves
simple ... *Clerodendron*

Corolla oblique. Calyx
widely obconic. Leaves
simple ... *Holmskioldia*

N. O. 126. *Labiatae*.

Aromatic herbs. Stems square. Leaves oppo-
site. Flowers in terminal spicate cymes (*e.g.*
Ocimum) or verticillasters (*e.g.* *Leonurus*).
Calyx bilabiate, posterior or upper lip of 3 sepals
and anterior or lower lip of 2 sepals. Corolla
bilabiate, upper lip of 2 petals and lower lip of
3 petals. Stamens 4, didynamous; or the two

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posterior are imperfect ; connective filiform and much elongated in *Salvia*. Pistil of 2 carpels united into a deeply 4-lobed ovary ; style gynobasic. Fruit of 4 nutlets. Chiefly a North-temperate order.

Sub-class—*Incompletæ*. Perianth 1 whorl only, sepaloïd or petaloïd, or 0. Flowers in many cases 1-sexual, in some 2-sexual.

Series—*Curvembryeæ*. Embryo curved, except in *Polygonaceæ*. Flowers 2-sexual. Perianth 1. Stamens as many as perianth lobes.

N. O. 128. Nyctagineæ.

Herbs, erect (*Mirabilis*) or prostrate (*Boerhaavia*), or twining, woody with prickles (*Bougainvillea*). Flowers 2-sexual, singly in a calyx-like involucre (*Mirabilis* and *Boerhaavia*) or three together in an involucre of three large coloured bracts (*Bougainvillea*). Stamens hypogynous, free, or united at the base. Pistil of 1 carpel. Ovary with 1 campylotropous ovule.

N. O. 130. *Amarantaceæ*.

Herbs. Flowers 2-sexual in spikes. Bracts and perianth-segments very dry and scarious or hard and pointed. Sepals 5, persistent. Stamens 5 (or fewer), free or united. Ovary 1-celled, 1-ovuled; ovule amphitropous.

Stamens free ... *Deeringia*

Stamens united by their filaments ... *Celosia*

Flowers unisexual. Stamens free ... *Amarantus*

Stamens with interposed staminodes, all united ... *Cyathula*

Sepals spinescent ... *Achyranthes*

N. O. 134. *Polygonaceæ*.

Aquatic or terrestrial herbs. Leaves with special stipules called Ochrææ. Flowers 2-sexual. Perianth 1, of 3-6 free or connate sepals. Stamens 5, 8 or 9, or fewer or more; filaments free or united at base into a cup. Ovary 3-gonous, superior, 1-celled, styles 3; stigmas capitate, peltate, or fimbriate. Ovule 1, of axial origin; orthotropous. Fruit a trigonous hard nut.

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Ochræa prominent. Perianth
4-5-cleft. Stigmas capitate... *Polygonum*

Ochræa hyaline disappearing
when old. Stigmas fim-
briate ... *Rumex*

Series.—Unisexuales. Flowers uni-sexual.

N. O. 151. *Euphorbiaceæ*.

Herbs, shrubs or trees, with abundant milky latex. Flowers often very small or minute with no perianth ; in a few genera they are large and have a double perianth, *e. g.*, *Jatropha*. Some species of *Euphorbia* show the utmost reduction in the flowers where each male flower consists only of a single stamen articulated on a stalk at the axil of a hairy bract, and a very large number of such flowers are packed together in a very much condensed cyme enclosed in a common calyx-like involucre, *e. g.*, *Euphorbia pulcherrima*. The female flower is also extremely reduced and consists of a solitary long-stalked pistil in the middle of the inflorescence called a *Cyathium*. Stamens various. Ovary superior, of 3 carpels united, 3-ceked ; styles 3. Fruit various, capsular or indehiscent. A very large order.

Cells of ovary 2-ovuled.

Many 1-stamened male florets surrounding a solitary pedicelled tricarpellary female, all in a calyx-like involucres ... *Euphorbia*

Herbs, shrubs or trees. Sepals 4-6.
Petals 0. Styles free or united below. Fruit dry, of 3 cocci... *Phyllanthus*

Trees or shrubs. Sepals present.
Petals 0. Styles dilated.
Stamens 2-3. Fruit a drupe.
Male flowers in axillary fascicles or solitary ... *Putranjiva*

Cells of ovary 1-ovuled.

Leaves digitately nerved or lobed.
Sepals 5, petaloid. Petals 5.
Stamens many. Flowers in 3-chotomous cymes ... *Jatropha*

Petals villous. Capsule of 3 cocci ... *Croton*

Petals 0. Styles very long, fimbriate or lacerate. Female flowers in large bracts ... *Acalypha*

Leaves opposite. Anther-cells parallel. Stamens very numerous ... *Trewia*

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Stamens united by their filaments
into indefinite bundles ... *Ricinus*

Twining herbs, hispid with stinging
hairs. Male calyx 3-5-partite.
Stamens 1-3. Styles connate be-
low, spreading above. Flowers
in axillary spikes or racemes ... *Tragia*

Tragia involucrata, L. is the *Bichuti*.

N. O. 153. *Urticaceæ*.

Herbs, shrubs or trees Flowers in Hypantho-
dium or cœnanthium. Perianth single or 0.
Stamens as many as perianth segments. Ovary
superior, 1-celled ; style excentric. Fruit, a drupe
or a samara, or a confluent mass of perianths and
pericarps, *i.e.* anthocarpous.

Erect herbs, sap watery. Dioecious.

Style 2-fid ... *Cannabis*

Cannabis sativa. The Indian
Hemp.

Trees or shrubs, sap milky. Sta-
mens inflexed in bud. Sepals
of female flowers fleshy in fruit.
Inflorescence spicate ... *Morus*

Trees, sap milky. Flowers extremely reduced, on the inner walls of a closed receptacle ... *Ficus*

Trees, sap milky. Flowers in globose, oblong or cylindric heads: male flowers 1-stamened ... *Artocarpus*

A. Lakoocha, Roxb. is the Jack-fruit tree. *A. incisa*, L. is the Bread-fruit tree.

Annual herbs with stinging hairs. Stipules connate. Achene oblique ... *Fleurya*

Stigma penicillate. Achene straight. Leaves opposite ... *Urtica*
Urtica dioica, Linn. is the English Nettle.

Herbs without stinging hairs. Perianth of female flower 3-5-partite. Stigma penicillate.

Leaves opposite, Flowers capitate or cymose ... *Pilea*

Leaves alternate. Flowers on a fleshy receptacle ... *Elatostema*

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A common weed in shady places—*Pilea microphylla*, Liebm = *Urtica microphylla*, L.—is known as the “gunpowder plant” (so called from the cloud of pollen discharged from the anthers when shaken). American.

Class—Gymnospermæ. Carpels not closed to form an ovary, but are open and bear the ovules on the upper surface near the base ; or the ovules in some are axial and not of foliar origin (*e.g.*, Gnetaceæ). Ovule orthotropous ; integument one only (compare Compositæ). Flowers always 1-sexual.

N. O. 165. *Coniferae*.

Trees. Leaves dimorphic. In the genus *Pinus* there are two kinds of leaves—Needle leaves and Scale leaves. The needle leaves are in clusters of two or more on special branches which are very short, known as dwarf spurs or dwarf shoots, and are produced in large numbers, each at the axil of the brown scale leaves. These brown scale leaves occur all over the stem and branches. The needle leaves do not bear buds at their axil. The dwarf spurs bearing the

needle leaves and surrounded at the base by a ring of scale leaves aggregate towards the ends of the branches and fall off together with their needle leaves when old. This is an instance of *branch-fall* corresponding to *leaf-fall* in deciduous trees. In the genus *Cupressus* the leaves are of one kind only and not dimorphic. They are scale-like and green and are the smallest and most numerous in the Coniferæ. They are densely appressed on the stem and branches all over.

Plants $\frac{\text{mon}}{\text{di}}$ œcious. Flowers of two kinds, never hermaphrodite. Microsporophylls, or staminate scales, and megasporophylls, or carpellary scales, are densely collected on short axes in different cones (the word is here used not in its true morphological sense which means an inflorescence, but refers to *flowers*) on the same or on different plants of a species. The flowers are thus loosely called male cones and female cones. Perianth 0. Seeds winged; they take 2 years to mature. *Vide* Goebel's *Organography*, p. 335.

N. O. 166. *Cycadaceæ*.

Trees of the Palm habit. Leaves of 2 kinds—brown scale leaves and a crown of large pinnate

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compound or pectinate leaves. The plants are always dioecious. Flowers consist of numerous large staminate or carpellary scales set spirally and very close together around the apex of the main stem a little behind its growing point. The stem continues to grow out after one flowering and bears the next flower after 30 years. The stem thus grows through the flower normally as in abnormal instances of median proliferation in roses. The staminate scales bear sori of microsporangia on the undersurface. The carpellary scales bear ovules along the margins. The only genus is *Cycas*.

N. O. 164. *Gnetaceæ*.

Climbing shrubs or erect trees with opposite leaves which are broad and foliaceous ; or some are leafless with minute scale leaves (*e.g.*, *Ephedra*, a Temperate Himalayan genus). Flowers are in whorls inside cup-shaped bracts which are arranged in spikes on an axis which may be axillary or terminal. Male and female flowers have a *perianth*. In the female flower the ovule is axial and is inside the perianth, but there is no carpellary scale.

Class—Monocotyledones. Flowers 3-merous.
 Venation of leaf usually striate. Leaves simple, except in Dioscoreaceæ where the leaves are digitately compound. Embryo with one cotyledon.

Series—Microspermæ. Perianth 2-seriate. Ovary 1 or 3-celled, inferior with parietal or axile placentæ. Seeds exalbuminous, very small and numerous.

N. O. 169. *Orchideæ*.

Epiphytic or terrestrial herbs with special aerial roots. The aerial stem is sometimes a pseudo-bulb. Flowers hermaphrodite, gynandrous. Corolla of 3 petals, 2 are lateral and 1 posterior and often the largest and 3-lobed ; this is apparently anterior in the flower owing to a twist in the ovary, and is called the Lip or Labellum. Calyx regular. Filaments and style united into a column opposite the lip carrying the anther on the head or on the back. The column is sometimes produced into a beak at its apex, known as the *rostellum*, and into a process at its base, known as the *foot*. The lateral sepals are sometimes united into a sac known as *mentum* adhering to the foot

of the column (e.g., *Dendrobium*, etc.). 'Pollen grains' cohere together into *pollinia* which are naked. Pollinia are attached to a stalk or *caudicle* that terminates in a gland on the rostellum. Ovary long, twisted, inferior, 1-celled ; ovules numerous, minute, on the ovarian walls inside. Stigma a viscid spot on the concave face of the column below the anther and opposite the lip. Fruit capsular.

Anther 1, opercular, deciduous, cells distinct, parallel. Pollinia not attached to the rostellum, nor by their bases, but held together at their base by a viscid appendage.

Inflorescence lateral on a leafy
or leafless stem, or terminal,
or from the top of a
1-2-leaved pseudobulb. Lip
adnate to the produced
foot of the column, not
mobile. Lateral sepals
adnate to the foot of the
column, forming with it a
sac or mentum ... *Dendrobium*

Inflorescence on a scape from
the base of the pseudobulb.
Flowers solitary, capitate,

umbelled spicate or racemose. Sepals free. Lip jointed on the foot of the column and mobile ... *Bulbophyllum*

Peduncles 1-many-flowered, axillary on a leafy stem, or on a pseudobulb. Column short, produced into a foot. Flowers small. Sepals free. Lip not mobile (except in *Eria pulchella* and *E. barbata*) ... *Eria*

Anther 1, opercular, cells confluent, not distinct. Pollinia attached to a gland or process of the rostellum.

Lip saccate or spurred at the base. Sepals and petals fleshy widely spreading from a narrow base. Flowers large in simple racemes. Epiphytes with leafy stem ... *Vanda*

Stem not bulbous; root bulbous.

Anther 1, opercular, persistent.

Pollen granular, powdery.

Lip not spurred, sessile or clawed.

Dorsal sepal and lateral petals
cohere together in an erect
hood. Column short, base
decurrent on the ovary.
Flowers in spikes, often
secund. Terrestrial ...

Spiranthes

Lip sessile, not clawed, adnate to
the column, shorter than the
sepals. Lateral sepals free,
dorsal with the petals
cohering in a hood. Column
winged in front, with 2
marginal stigmatic lobes.
Terrestrial ...

Zeuxine

Anther 1, erect, inclined or re-
flexed, adnate to the column
and continuous with the
rostellum. Pollinia 1,
granular, provided with short
caudicles with or without a
gland. Terrestrial herbs.

Anther erect. Rostellum not
elongate. Flowers spicate
or racemose. Sepals not
shorter than petals ...

Habenaria

Series—Epigynææ. Ovary inferior. Seeds albuminous.

•N. O. 170. *Scitamineæ*.

Herbs with rhizomes. Flowers 3-merous. One petal posterior. Stamens in two whorls of 3 in each. Ovary inferior, 3-celled ; style slender. Fruit capsular, crowned with the remains of the perianth, subdivided into three sub-orders :—

- I. Museæ. Inflorescence a spadix. Stamens 5 perfect ; the *posterior* stamen of the *inner whorl* is absent or represented by a staminode.
- II. Zingibereæ. Inflorescence a spike. *Anterior* stamen of the *outer whorl* is absent ; the *laterals* are *staminodes*. The *posterior* stamen of the *inner whorl* is perfect ; the laterals are staminodes and are fused together. Style slender embraced below the stigma by the anther.
- III. Canneæ. Inflorescence a spike. *Posterior* stamen of the *inner whorl* is perfect and is petaloid. All the rest are staminodes and none are fused together.

Musæ.

Stem sub-arboreous, made up of a casing of several very thick and strong long leaf bases much imbricating and jacketing around the stem which forms a central core. The stem terminates directly in a stout compound spike with large spathaceous bracts ... *Musa*

Zingibereæ.

- (i) Bracts cucullate, forming a cone-like spike. Filament petaloid.

Fruit sub-dehiscent, ovary 3-celled (*Curcuma Longa*, L. is the Turmeric) ... *Curcuma*

Flowering stem leafy. Filament long, slender ... *Hedychium*

- (ii) All the stamens of the *outer whorl* are *absent*. *Posterior inner* is perfect and the laterals are staminodes fused together forming the lip.

Flowers in cone- like spikes	Flowering scapes leafless. Filament short. Connective dilated, crested or 2-lobed	<i>Anomum</i>
	Connective produced into a long appendage (<i>Zinziber officinale</i> , Rosc. is the Ginger.)	... <i>Zingiber</i>

N. O. 174. *Amaryllidaceæ*. —

Bulbous herbs. Flowers on a scape which is leafless. Leaves radical ; the leaves and scapes are contemporaneous, or in some plants appear separately, *i.e.*, during the flowering time there are no leaves and the scape comes out from the sub-terranean bulb. Flowers are in umbels (or spikes) on the solid scape. Perianth members are in two whorls united together into a gamophyllous petaloid structure. A corona is present in some (*e.g.*, *Narcissus*—non-Indian), stamens 6 ; anthers, versatile ; filaments free or connate, adherent to the base of the perianth. Ovary inferior, 3-celled.

Filaments free ... *Crinum*

Filaments united by a membrane ... *Pancratiium*

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Series—*Coronariæ*. Ovary superior. Corolla present in some.

N. O. 178. *Liliaceæ*.

Bulbous herbs, or undershrubs. Flowers on a scape, or not. Perianth 6; in two series, petaloid or green. Stamens 6, anthers versatile. Ovary superior, 3-celled.

Climbing shrubs. Leaves 3-5-nerved; nervules reticulate; petiole with 2 tendrils above the base. Flowers small in umbels *Smilax*

Erect or climbing under-shrubs. Leaves minute bearing in their axils fascicles of cladodes *Asparagus*

Under-shrubs with radical and cauline leaves, showing secondary growth of a peculiar kind. Perianth cylindric, funnel-shaped or campanulate. Fruit a berry *Dracæna*

Bulbous herbs. Scape simple. Flowers capitate or umbellate enclosed in a spathaceous involucre when young. Capsule loculicidal *Allium*

Tuberous herbs. Stem leafy. Leaves not sheathing. Flowers axillary, large. Stem twining. Leaves with a tendril-like prolongation of the midrib ... *Gloriosa*

N. O. 183. *Commelinaceæ*.

Prostrate or decumbent herbs growing in cool shady and wet places. Flowers are small and very delicate and are in cymes ; often in heart-shaped or boat-shaped and strongly imbricating bracts. Perianth 6-partite, 3 outer green and 3 inner petaloid. Stamens 6, on the base of the segments. Ovary superior, 3-celled. Fruit indehiscent or capsular.

Fruit loculicidal. Stamens 3 perfect, 3 staminodes. Cymes included in a spathe (The common *Commelina benghalensis* has two kinds of spathes: (i) Aerial and (ii) Underground bearing cleistogamous flowers.) ... *Commelina*

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Fruit loculicidal. Stamens 6, perfect. Cymes scorpioid, in imbricating biseriate foliaceous more or less boat-shaped large bracteoles. Perianth of calyx and corolla *Cyanotis*

Series—Calycinæ. Perianth sepaloid and coriaceous. Ovary superior.

N. O. 187. *Palmeæ*.

Trees with unbranched (rarely branched) stem and a crown of pinnately sected or palmately sected leaves as in *Cocos* and *Borassus* respectively. Flowers small hermaphrodite or unisexual in catkins subtended by a large boat-shaped spathaceous bract. Perianth segments 6, all free. Stamens 3-6 or more. Ovary superior, 3-celled. (The pistil consists of 3 free carpels in a few genera, *e.g.*, *Phoenix*, the Date Palm).

Spedices *infracoliar*, *i.e.*, flowering when the subtending leaf has fallen. Leaves *pinnatisect* ... *Areca*

Spedices *interfoliar*, *i.e.*, flowering while the subtending leaf is alive and has not fallen.

Leaves pinnatisect, armed.

Fruit clothed with shining
appressed scales. Spathes
tubular (Certain species
are climbing.) ... *Calamus*

Leaves pinnatisect. Fruit

a fibrous drupe. Seed
adherent to the stony
endocarp ... *Cocos*

Leaves bipinnatisect. Flow-

ers solitary or 3-nate ;
unisexual ; stamens many
(*C. urens*, L. is the Indian
Sago.) ... *Caryota*

Leaves flabelliform. Spa-

thes numerous. Flowers
dioecious. Male flowers
minute, sunk in cavities
on the axis of inflores-
cence ; female flowers very
large, sessile on very short
branches of a very stout
spadix ... *Borassus*

Series—Nudifloræ. Flowers naked, *i.e.*, Perianth 0. Ovary superior.

N. O. 191. *Aroideæ*.

Herbs with a corm; or some with aerial twining stem. Leaves radical or cauline. Flowers unisexual or hermaphrodite in special inflorescence called Arum with a single spathe. Staminate flowers consist of sessile or stipitate anthers in a dense spike above the similarly arranged sessile pistillate flowers on the same fleshy axis of inflorescence.

Flowers monœcious. Perianth 0.

Spadix appendaged, *i.e.*, with a flowerless top. Leaves 1 or 2, radical, pedatisect or compound trifoliate, or leaflets whorled.

Terrestrial tuberous herbs ... *Arisæma*

Spadix 0. Floating stemless herb, multiplying by stolon. Leaves simple, forming a cup ...

Pistia

Tuberous herbs, flowering before leafing. Leaves 3-sect, segments pinnatifid (*A. campanulatus*, Bl. is the *Ol.* It is rather a corm than a tuber.)...

Amorphophallus

- Axis of inflorescence (spadix)
 shorter than the spathe.
 Leaves undivided, often peltate.
 Tube of spathe enclosing the
 fruit, but free from it.
- Limb of spathe refracted, open
 (*R. Vivipara*, Schott. shows
 vivipary.) ... *Remusatia*
- Limb of spathe erect. Ovules
 many (*C. antiquorum*, Schott.
 is the *Kochu*.) ... *Colocasia*
- Limb of spathe erect. Ovules few
 (*A. indica*, Schott. is
Mankochu.) ... *Alocasia*
- Flowers hermaphrodite, perianth 0.
- Spadix without appendage. Ovary
 truncate, Climbers.
- Spadix sessile, berries free ... *Scindapsus*
- Berries confluent ... *Rhaphi-*
dophora
- Flowers hermaphrodite Perianth
 of 4-6 segments.
- Stem scandent. Leaves distichous
 with winged petiole ... *Pothos*

N. O. 192. Lemnaceæ.

Minute aquatic free-floating plants. Stemless. The plant body is a free-living leaf, multiplying vegetatively in immense numbers completely covering every inch of available water surface. Flowers appear only when the plants are unfavourably situated due to the sinking of the water surface by evaporation, and consist of 1-2 stamens occurring in marginal clefts of the plant body (called Frond) or an ovary.

The two genera *Lemna* and *Wolffia* live together. The latter are very minute, like sand grains and are the smallest of phanerogamic plants.

Series—*Apocarpeæ*. Pistil apocarpous.

N. O. 194. Alismaceæ.

Aquatic or marsh herbs. Leaves radical, entire, sagittate. Stem 0. Flowers pedicelled in umbelled whorls ; uni- or bisexual. Perianth 6, 2-seriate, outer sepaloid inner petaloid. Stamens 3-9. Carpels very many. Fruit of achenes or follicles.

Stamens 6-9.	Fls. herma-	
phrodite	...	<i>Alisma</i>
Stamens many.	Fls. herma-	
phrodite	...	<i>Sagittaria</i>
Fruit of follicles.	Marsh herb	
with milky juice	...	<i>Butomopsis</i>

N. O. 195. *Naiadaceæ*.

Aquatic or marsh herbs. Flowers inconspicuous, hermaphrodite or 1-sexual, green or white, in spikes, racemes or spadices. Perianth 0, or present. Stamens 1-6, hypogynous. Carpels few.

Aquatics. Sepals 1-3, white membranous, unequal. Stamens 6. Carpels 1 or more. Flowers absolutely sessile on the very long filiform scape ... *Aponogeton*

Aquatics. Sepals 4, herbaceous, green. Anthers 4, sessile on the Sepals. Carpels 4 ... *Potamogeton*

Aquatics. Perianth hyaline. Stamen 1. Flowers minute ... *Naias*

Series—Glumaceæ. Bracts of Inflorescence glumaceous. Flowers in spikelets.

N. O. 199. Cyperaceæ.

Perennial herbs with tristichous leaves and solid stem which may be cylindric or 3-cornered. Petiole of the leaf is stem-clasping and is not slit. Flowers minute in spikelets on a scape. All the glumes of a spikelet are often flowering. Pale 0. Perianth of flower 0 or represented by bristles ; In the genus *Carex* the perianth is utricular and persistent ; stamens 1-3. Pistil of 3 carpels united ; style 2-3-fid ; ovary 1-celled. The fruit is a trigonous nut. Seed albuminous.

N. O. 200. Gramineæ.

Annual or perennial herbs of various habit, or trees (Bamboos) with hollow and jointed stem. Leaf-sheath split, and with a ligule at the junction of the blade and petiole. Flowers in spikelets. The lowest and the next upper (I and II) glumes are alway sempty. The perianth is represented by 2 lodicules. Opposite each flowering glume is

another bract similar to it in structure, but a little smaller, called the Pale which bears the flower at its base. Stamens 3. Pistil monocarpellary; ovary 1-celled; styles two often feathery. Fruit a seed-like utricle. Seeds albuminous. The albumen is the cereal grain.

Note.—Subdivisions of the natural orders Cyperaceæ and Gramineæ into the respective genera are very difficult and should not be included within the scope of the Honours B.Sc. standard.
